C21.5:952/1

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November 2, 1976

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OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

November 2, 1976 Volume 952 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Board of Appeals Decisions Rendered in the Month of September 1976

Examiner affirmed	202
Examiner affirmed in part	35
Examiner reversed	85
Total	322

August and September 1976 Classification Orders

The reclassifications covered by the following classification changes became effective during August and September 1976.

Classification Order 540, effective August 16, 1976:

	Class	Subclasses
Abolished	136	1; 3; 6-76; 83-88; and 90-182.
Established	29	623.1-623.5.
	141	1.1.
	204	2.1.
	252	182.1 and 425.3.
	(New) 429	1-255.
Position changes	136	89.
Title changes	136	

Classification Order 541, effective August 19, 1976:

Abolished	198	1-289 (ALL) Digest 1-18.
Established	105	48.1.
	193	44-48.
	198	300-866 and 950-954.
Position changes	None	
Title changes	None	

Classification Order 542, effective September 7, 1976:

	Design classes	Subclasses
Abolished	D11; 37; 39; 40; 46; 49; 55; 63; 65; 67; 70; 77; 81; 93; 94 and 98	ALL.
	D7	165-174.
	35	1 and 2.
	47	5.
	54	4-14.
	92	15.
Established	(New) D15	1-150 and 199.
Position changes	None	
Title changes	None	

Classification Order 543, effective September 7, 1976:

	Class	Subclasses
Abolished	D8	262.
	29	ALL.
	35	3.
	45	ALL.
Established	(New) D11	1-184.
	31	21.1-21.3.
Position changes	None	
Title changes	D22	99.
	25	58.
	31	24.

Classification Order 544, effective September 28, 1976:

Abolished	248	27.
Established	248	27.1 and 27.3.
Position changes	None	
Title changes	None	

ALFRED C. MARMOR
Administrator for Documentation
October 6, 1976.

Patent Suits

Notices under 35 U.S.C. 290: Patent Act of 1952

2,939,738, R. J. Lyons, SUPPORT FOR HINGED COVERS, **filed** June 2, 1976, D.C. Del. (Wilmington) Doc. 76-186, *The Bilco Co. and Orbert J. Lyons* v. *Potomac Iron Works, Inc.*

3,128,315, D. E. Hardies, MEHTYLCHLOROFORM STABILIZED WITH DIALKYLETHERS OF ALKYLENE GLYCOLS, **filed** Oct. 9, 1973, D.C., N.D. Ohio (Cleveland) Doc. C-73-1047, *PPG Industries, Inc.* v. *The Dow Chemical Company.* Stipulation and order dismissing complaint and counterclaim with prejudice; this dismissal is pursuant to a settlement between the parties and does not constitute an adjudication of validity, infringement or enforceability of the patent in suit filed, May 24, 1976.

3,208,539, H. I. Henderson, APPARATUS FOR DRILLING WELLS, **filed** May 18, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c1843, *Walker-Neer Manufacturing Company* v. *Drill Systems, Inc. and Upper Canada Resources, Ltd.*

3,221,300, R. Benghiat, PRIORITY INTERRUPT MONITORING SYSTEM; **Re. 28,221,** same, **filed** Feb. 11, 1975, D.C. Del. (Wilmington) Doc. C.A. 75-39, *Western Electric Company, Inc. and American Telephone & Telegraph Co.* v. *The Riley Company.* Pursuant to Rule 41(a)(2) F.R.C.P., all claims and causes of action stated in the complaint and counterclaim are hereby dismissed with prejudice, May 19, 1976.

3,306,465, F. P. Brennan, WARDROBE HANGER BAR WITH CAP LOCKING MEANS, **filed** May 13, 1976, D.C.N.J. (Camden) Doc. 76-0887, *Francis P. Brennan* v. *Garment Bar, Inc.*

3,404,675, R. E. Payne, LIFT-OFF OVEN DOOR SEAL; **3,810,483,** A. W. Vonderhaar, REMOVABLE OVEN DOOR SEAL, **filed** May 28, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c1994, *K & M Rubber Co.* v. *The Tappan Co.*

3,487,221, L. M. Frank, LIGHT ACTIVATED TRIGGER FOR PHOTOGRAPHIC FLASH SYSTEM, **filed** May 24, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c1928, *The Lase Co.* v. *Lawrence L. Goldberg, doing business as Lenmar Enterprises.*

3,558,244, R. Uchiyama, HIGH PRESSURE PUMP; **3,652,188,** same, **filed** May 11, 1976, D.C., N.D. Ohio (Toledo) Doc. C76-237, *Cat Pumps Corporation* v. *Giant Corporation.*

3,622,364, Sugahara, Miyazawa, Nakazawa and Maeno, COLOR FORMER FOR PRESSURE SENSITIVE RECORDING PAPER AND PROCESS FOR PRODUCING SAME; **3,753,761,** same, PRESSURE SENSITIVE RECORDING PAPER, **filed** Apr. 21, 1975, D.C., W.D.N.Y. (Buffalo) Doc. C-75-155, *Moore Business Forms, Inc.* v. *Mizusawa Kagaku Kogyo Kabushiki Kaisha.* Action dismissed without prejudice pursuant to Rule 41(a)(1) of the F.R.C.P., Apr. 28, 1975.

3,652,188. (See 3,558,244.)

3,733,267, Gordon W. Haase, PROCESS OF FILTRATION OF DRY CLEANING FLUID, **filed** May 25, 1975, D.C., N.D. Ohio (Akron) Doc. C76-159A, *Frederick Taussig* v. *Jack and Jill One Hour Cleaners No. 12, Inc.*

3,739,957, M. Alpern, COVER FOR DECANTER OR LIKE LIQUID DISPENSING CONTAINER; **3,853,250,** same, COVER FOR DECANTER OR LIKE DISPENSING CONTAINER; **3,858,251,** same, COVER FOR DECANTER OR LIKE LIQUID DISPENSING CONTAINER, **filed** May 25, 1976, D.C., S.D.N.Y., Doc. 76-C-2349 RJC, *Sam Sabin and Sally Rodgers* v. *Corning Glass Works.*

3,753,761. (See 3,622,364.)

3,810,483. (See 3,404,675.)

3,831,533, H. F. Kellogg, SHELVING SYSTEM; **D. 232,144,** J. A. Ford, SHELF SPINDLE, **filed** Sept. 11, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c3030, *Kirsch Company* v. *Edgecraft Corporation et al.* Ordered that defendant, Mandell-Halperin Associates, Inc., is entitled to summary judgment according to law; summary judgment is entered in favor of said defendant, and the above cause is ordered dismissed, Feb. 24, 1976.

3,853,250. (See 3,739,957.)

3,853,251. (See 3,739,957.)

3,864,768, R. Fraige, and J. Reed, WATER MATTRESS WITH INTERNAL FLOAT TUBE, **filed** May 26, 1976, D.C., N.D. Calif. (San Francisco) Doc. C-76-1076-CBR, *Vinyl Products Manufacturing Inc. and Richard Fraige* v. *Dyna Clean Inc. and Aquarian Products Corporation.*

3,897,597, D. R. Kasper, **FACE AND HEAD PROTECTOR**, **filed** May 21, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c1917, *Margaret E. Kasper* v. *Cooper Canada Limited.*

3,944,069, J. D. Eldridge, Jr., **RECEIVER FOR DISPOSABLE SURGICAL IMPLEMENTS**, **filed** June 7, 1976, D.C., N.D. Calif. (San Francisco) Doc. C-76-1147-SC, *Instranetics Inc.* v. *Acura-Med.*

3,958,350, J. Garson, **SIGN BOARD FOR TRUCK TRAILERS SEMI-TRAILERS AND SHIPPING CONTAINERS**, **filed** May 25, 1976, D.C.N.J. (Newark) Doc. 76-984, *Selecto-Flash, Inc.* v. *Kux Manufacturing Company, Inc.*

Re. 28,221. (See 3,221,309.)

D. 232,144. (See 3,831,533.)

PATENT NOTICES

Certificates of Correction for the Week of Nov. 2, 1976

Re. 28,636	3,933,469	3,960,476	3,971,427
D. 237,357	3,933,579	3,961,627	3,972,467
D. 240,358	3,934,162	3,962,259	3,972,765
3,651,206	3,939,058	3,962,437	3,973,274
3,665,076	3,939,270	3,962,908	3,973,633
3,709,885	3,940,625	3,963,016	3,973,717
3,709,988	3,942,532	3,963,532	3,973,911
3,755,346	3,943,132	3,963,715	3,973,955
3,800,004	3,944,690	3,964,028	3,973,966
3,819,652	3,946,305	3,964,360	3,974,002
3,821,284	3,947,104	3,965,145	3,974,121
3,853,580	3,947,220	3,965,456	3,974,137
3,855,291	3,947,669	3,965,519	3,974,173
3,881,381	3,949,870	3,965,879	3,974,293
3,882,114	3,950,430	3,966,460	3,974,359
3,887,268	3,950,813	3,966,747	3,974,411
3,896,330	3,951,540	3,966,752	3,974,414
3,899,086	3,951,594	3,966,830	3,974,472
3,901,899	3,951,869	3,966,863	3,974,750
3,904,251	3,951,898	3,967,161	3,974,863
3,904,682	3,951,961	3,967,362	3,975,434
3,907,129	3,952,738	3,967,945	3,975,903
3,908,248	3,953,920	3,968,216	3,975,929
3,915,381	3,955,027	3,968,229	3,976,006
3,915,993	3,956,388	3,968,711	3,976,132
3,917,785	3,956,407	3,968,784	3,976,294
3,919,933	3,956,655	3,969,192	3,976,528
3,920,728	3,956,896	3,969,202	3,976,762
3,920,843	3,957,140	3,969,248	3,977,073
3,922,293	3,957,540	3,969,418	3,977,213
3,923,931	3,957,915	3,969,463	3,977,337
3,925,296	3,957,964	3,969,512	3,977,382
3,925,765	3,959,257	3,969,888	3,977,395
3,926,306	3,959,296	3,970,128	3,978,000
3,928,565	3,959,576	3,970,182	3,978,051
3,928,690	3,960,019	3,970,747	3,978,167
3,930,501	3,960,130	3,970,777	3,978,650
3,932,415	3,960,234	3,970,905	3,978,731
3,933,251	3,960,472	3,971,007	3,978,798

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF SEPTEMBER 30, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-28-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	2-13-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	10-20-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	1-22-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	7-16-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	1-6-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-2-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	4-1-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-2-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-22-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	4-19-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	11-5-75
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	3-8-76

Expiration of patents: The patents within the range of numbers indicated below expire during October 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,907,087 to 2,910,696, inclusive
Plant Patents..... Numbers 1,870 to 1,875, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED NOVEMBER 2, 1976

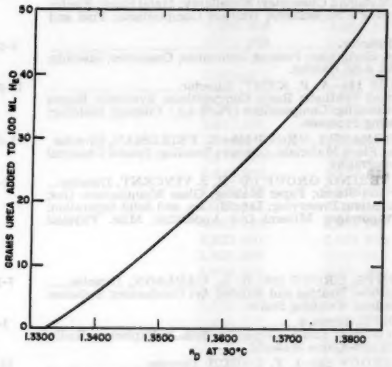
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T952,001
RAPID METHOD FOR DETERMINING DISSOLUTION RATES OF CONTROLLED RELEASE FERTILIZER MATERIALS

Robin M. Scheib and Guerry H. McClellan, Killen, Ala., assignors to Tennessee Valley Authority

Filed Feb. 17, 1976, Ser. No. 658,597
Int. Cl.[2] G01N *21/46, 33/00*
U.S. Cl. 23—230 R
1 Sheet Drawing. 13 Pages Specification



A rapid quality control method for determining the long-term release rate of controlled release fertilizer material. The accepted industry method for testing sulfur-coated urea (SCU) is the seven-day release rate test (SDDR). The instant method was developed to give a release rate which correlated with the SDDR: 50 g. of freshly prepared SCU is put in a cylindrical vessel about 50 mm. in diameter, about 80 mm. high, and having a hemispherical bottom with 100.0 ml. of water. The tip of a probe-type ultrasonic generator is immersed about 2 to 3 cm. into the water and offset from the vertical center line of the vessel about 10 mm. The slurry is subjected to 1.0 minute (.5 to 2 minutes) of ultrasonic vibration at 20,000 Hz. (10,000 Hz. to about 100,000 Hz.) at 200 watts; the slurry is then transferred to a 600-ml. Erlenmeyer flask which is attached to a wrist action shaker such that the bottom half is submerged in a 70° C. (60° C. to 80° C.) water bath and shaken for 10.0 minutes. The refractive index of a filtered portion of the slurry is determined; the urea released can be determined from an appropriately constructed graph or from the formula:

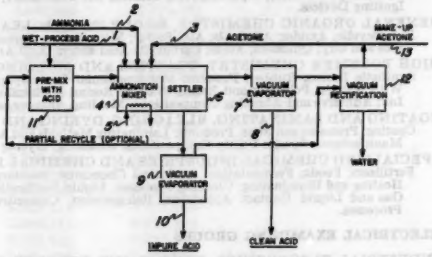
$$\frac{10649.863-16630.54622n_D+6482.844917n_D^2}{50-\%\text{ coating weight}/2}\times 100=\%\text{ urea released}$$

where n_D=refractive index of urea solution.

T952,002
PARTIAL PURIFICATION OF WET-PROCESS PHOSPHORIC ACID WITH ACETONE AND AMMONIA

Henry K. Walters, Jr., Yong K. Kim, and John D. Hatfield, Florence, Ala., assignors to Tennessee Valley Authority

Filed Aug. 29, 1975, Ser. No. 608,834
Int. Cl.[2] C01B *25/16;* C05B *7/00*
U.S. Cl. 71—34
1 Sheet Drawing. 13 Pages Specification



An improved process for the purification of wet process acid (hereinafter referred to as WPPA) with acetone and ammonia. The WPPA is partially ammoniated and mixed with acetone to separate most of the metallic and anionic impurities in a rapidly separable bottom liquid layer and the purified acid in the top layer. The top clear layer contains about 75 percent of the acid, nearly all the acetone, and a small fraction of the impurities; and the bottom layer contains the remainder of the materials. The acetone is recovered from the two layers by distillation thereby yielding the purified acid and an impure acid suitable for fertilizer manufacture.

The optimum ranges of ammonia and acetone to give good purification are from about 0.2 to 0.6 mole of ammonia per mole of P_2O_5 in the WPPA, and from one to 5 pounds of acetone per pound of WPPA. WPPA containing P_2O_5 ranging from about 25 to about 55 weight percent is easily purified in this improved batch or continuous process. Only about 3 minutes of mixing of the acetone with the ammoniated acid are required and about one minute is usually required for a clean separation of the two liquid layers.

T952,003
POLYESTER/ACRYLIC LOOP PILE FABRIC

Joseph M. Perri, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del.

Filed Sept. 22, 1975, Ser. No. 615,496
Int. Cl.[2] D03D *27/00;* D04H *11/00*
U.S. Cl. 428—97
No Drawing. 9 Pages Specification

Loop pile carpets produced from a blend of acrylic fibers with a small proportion of polyester fibers are flame

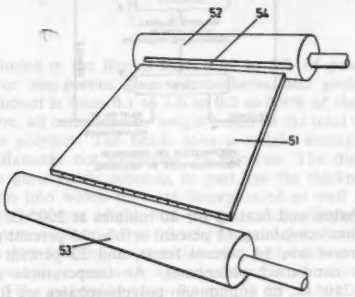
resistant and much more durable than corresponding all-acrylic carpets, said blend is compound of 60 to 80 weight percent of acrylonitrile polymer staple fibers having a denier per filament of 12 to 18, and 40 to 20 weight percent of polyethlene terephthalate staple fibers having a denier per filament of 12 to 18.

T952,004

HEAT EXCHANGER AND A SOLAR HEATER INCLUDING THE HEAT EXCHANGER

Derek Samuel Brackman, Stanmore, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Jan. 31, 1975, Ser. No. 546,147
Claims priority, application Great Britain, Feb. 7, 1974, 5,638/74; Jan. 15, 1975, 1,729/75
Int. Cl.² F24J *3/02*
U.S. Cl. 126—271
5 Sheets Drawing. 26 Pages Specification



A heat exchanger formed of headers joined together by means of plastics extrudate comprising a multiplicity of channels which provide paths for the passage of a fluid between the headers, the plastics being a highly crystalline polyolefin of the type which can be made using transition metal polymerization catalysts. The preferred polyolefin is polypropylene homopolymer or copolymer with up to 15% by weight of ethylene. Profile extruded packaging boards are convenient, and are readily attached to the headers with negligible distortion of the thin boards, by extruding polypropylene sealer into contact with both of them in juxtaposition so that it fuses to them and on cooling joins them together. The heat exchanger is suitable as a solar panel either exposed or enclosed in a thermally insulated chamber having a window to admit solar radiation.

T952,005

COATING COMPOSITION COMPRISING PTFE, POLYPHENYLENE SULFIDE AND A POLYSULFONE

Terence Edwin Attwood, Kimpton, and Barry William Farrant, Bristol, England, assignors to Imperial Chemical Industries Limited, London, England

Filed July 14, 1975, Ser. No. 595,754
Claims priority, application United Kingdom, July 23, 1974, 32,496/74
Int. Cl.² C08L *27/18*
U.S. Cl. 260—900
No Drawing. 17 Pages Specification

Polymeric coating compositions are described comprised of one or more fluorocarbon polymers, a polyphenylene sulphide polymer and thermoplastic aromatic polysulphones, which when coated onto metal surfaces, such as cookware or the like, provide temperature-resistant, low friction, non-stick surfaces. There are basically 3 types of polymers in the coating compositions described herein: polytetrafluoroethylene is usually the fluorocarbon polymer; the polyphenylene sulphide polymers are usually para-phenylene units linked by sulphide groups, either linear or branched, and generally available in commerce under the trademark Ryton; the thermoplastic aromatic polysulphones represent a class of known polymers comprising repeating units of the formula:

$$—Ar—SO_2—$$

in which Ar is a bivalent aromatic radical which may vary from unit to unit in the polymer chain giving rise to various copolymers. Of this class of materials preference is given to the thermoplastic aromatic polysulphones having a reduced viscosity of at least 0.3 and containing at least 0.2 aromatically bound hydroxyl groups per 100 polymer repeat units.

The polymeric compositions are conveniently applied according to conventional techniques, such as spraying, dipping, brushing and the like, after which the coating is heated to 330–450° C. usually in an oxygen-containing atmosphere within this temperature range and using PTFE as the fluorocarbon polymer, the PTFE is sintered. Suitable substrates include glass, ceramics, ferrous metals such as cast iron, stainless steel, aluminum and various composite surfaces. In addition to providing a non-stick surface for frypans, saucepans, bakeware and the like, other industrial applications will be apparent, like mold lining, rollers, hoppers and the like.

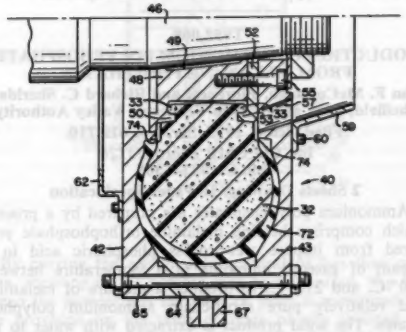
Typical coating compositions include 6–15% by weight of polyphenylene sulphide, 6–15% of the thermoplastic aromatic polysulphone, 3–12% PTFE lubricant powder, a suitable amount of surfactant and optionally up to 10% fillers, balance water.

T952,006

METHOD OF PRODUCING VEHICLE TIRES

Walter R. Hausch, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation of abandoned application Ser. No. 415,268, Nov. 12, 1973. This application July 28, 1975, Ser. No. 599,810
Int. Cl.² B29C *5/04*
U.S. Cl. 264—311
2 Sheets Drawing. 10 Pages Specification



A method of making vehicle tires is disclosed which comprises making a polystyrene core and positioning it in a tire mold. A tire material like polyurethane is cast into the cavity between the mold and core and after the tire has been cast the core of polystyrene is removed by dissolving the core with a suitable solvent.

T952,007

METHOD OF PACKAGING

Eric Nield, Hertford, Daphne Ann Thomas, Harpenden, and Clive William Frederick Hicks, London, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Sept. 29, 1975, Ser. No. 617,527

Claims priority, application United Kingdom, Oct. 18, 1974, 45,224/74

Int. Cl.² B29C *17/02, 25/00;* B32B *27/00, 31/04*

U.S. Cl. 264—230

No Drawing. 22 Pages Specification

A method of packaging an article is disclosed which includes stretching a film made from a thermoplastic composition in at least one direction, and preferably in two mutually perpendicular directions, at a temperature of 10, 20° C. or up to 25° above the Vicat softening point of the thermoplastic composition using a draw ratio of 1.2:1 to 2.1:1, and then shrink-wrapping the article to be packaged in the film using a film-reheat temperature of at least the Vicat softening point and preferably at a temperature of up to 5° C. above the Vicat softening point.

The thermoplastic composition comprises a homogeneous copolymer of acrylonitrile and at least one aromatic olefin preferably styrene or α-methyl styrene having a molar concentration of acrylonitrile units of 66 to 93% or preferably 80–93%, a molar concentration of aromatic olefin units of 7 to 34%, and a molar concentration of units of at least one other ethylenically unsaturated monomer copolymerizable with acrylonitrile of 0 to 10%. The quantities are chosen to total 100 mole percent, and optionally include a compatible graft copolymer having a diene rubber substrate containing 40 to 100% molar of units of at least one conjugated 1,3-diene monomer and 0 to 60% molar of units of at least one other ethylenically unsaturated monomer copolymerizable therewith with free-radical yielding catalysts, the concentration of graft copolymer if used being such that its rubber content is not more than 50% of the thermoplastic composition. Preferably the graft copolymer when employed has a superstrate of a homogeneous copolymer of acrylonitrile and aromatic olefin with a molar concentration of 75 to 93% acrylonitrile units.

The shrinkage of a film made from the described thermoplastic composition oriented according to the invention decreases as the draw ratio increases. This is surprising since the opposite could have been expected.

T952,008

PRODUCTION OF AMMONIUM POLYPHOSPHATES FROM MELAMINE PHOSPHATES

John F. McCullough, Florence, and Richard C. Sheridan, Sheffield, Ala., assignors to Tennessee Valley Authority

Filed Oct. 6, 1975, Ser. No. 619,710

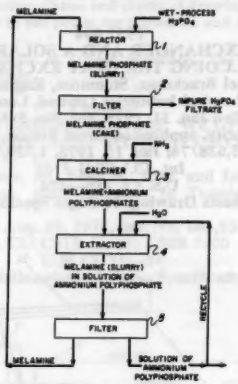
Int. Cl.² C01B *15/16, 25/26*

U.S. Cl. 423—305

2 Sheets Drawing. 10 Pages Specification

Ammonium polyphosphates are prepared by a process which comprises heating melamine orthophosphate prepared from impure wet-process phosphoric acid in a stream of gaseous ammonia at a temperature between 150° C. and 210° C. to produce a mixture of melamine and relatively pure short-chain ammonium polyphosphates. The solid product is extracted with water to remove the ammonium polyphosphates and free the insoluble crystalline melamine. The melamine is recycled by treating it with phosphoric acid to make additional melamine orthophosphate. Thus, the only starting materials consumed in the process are phosphoric acid and ammonia.

The distribution of phosphate species in the product may be varied by regulating the time and temperature of heating. A product containing 59 percent ortho-, 38 percent pyro-, and 3 percent more highly condensed phosphates is obtained by heating for 90 minutes at 160° C.; heating for 40 minutes at 180° C. yields a product containing 26 percent ortho-, 60 percent pyro-, 10 percent tri-, 2 percent tetra-, and 2 percent more highly condensed phosphates; and heating for 20 minutes at 200° C. yields a product containing 11 percent ortho-, 35 percent pyro-, 17 percent tri-, 14 percent tetra-, and 23 percent more highly condensed phosphates. At temperatures above about 210° C., no ammonium polyphosphates are formed and melamine long-chain polyphosphate is the product.



PREPARATION OF AMMONIUM POLYPHOSPHATE BY MELAMINE

T952,009

LATEX FOAM HAVING REDUCED SMOKE EMISSION ON COMBUSTION

David Francis Lawson, 163 W. Wellock Drive 44319; Durward Thomas Roberts, Jr., 616 Castle Blvd. 44303; and Edward Leo Kay, 79 S. Tamarack Road 44319, all of Akron, Ohio

Continuation of abandoned application Ser. No. 518,006, Oct. 25, 1974. This application Oct. 20, 1975, Ser. No. 624,022

Int. Cl.² C08J *9/30*

U.S. Cl. 260—2.5 L

No Drawing. 14 Pages Specification

Latex foam containing from 20 to 200 parts by weight of magnesium hydroxide per 100 parts of elastomer produces lower smoke levels on combustion.

T952,010

POLYMERIC FILMS

Leslie Gregson, Welwyn Garden City, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of abandoned application Ser. No. 490,192, July 19, 1974. This application Nov. 18, 1975, Ser. No. 632,896

Claims priority, application United Kingdom, Aug. 7, 1973, 37,368/73

Int. Cl.² B29C *17/04;* D01F *1/10*

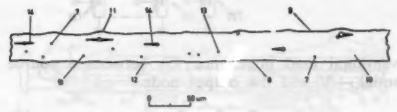
U.S. Cl. 260—37 R

2 Sheets Drawing. 19 Pages Specification

Synthetic polymeric films are disclosed having improved slip, and anti-blocking characteristics are disclosed which contain a minor amount of particulate glass beads therein. Blocking is the condition wherein successive layers of film wound onto a reel adhere to one another so as to

exclude nearly all of the air from between the adjacent film layers. When unwound from the reel tearing of the film may occur.

I have discovered a polymeric film which is particularly adapted for use as a dielectric spacer in wound electrical capacitors so that rapid winding of the capacitor may be achieved. As the base film-forming material a number of polymers or copolymers may be used including polyolefins, polycarbonates, polysulphones, polyamides, polyesters and vinyl polymers. A preferred material is a crystalline polymer of propylene, either in the homopolymer form or copolymerized with up to 15% of other monomers such as ethylene.



Included in the film is from 0.01 to 5% of powdered glass or non-porous glass microspheres, and preferably the amount is from 0.1 to 1.0 or 0.2 to 0.8% of the glass additive, all calculated by weight based on the total weight of the polymer. The beads have a weight average particle diameter not exceeding 25 microns. The diameter of the glass beads depends, in part, on the thickness of the film into which they are incorporated as well as the ultimate end use of the film product. Accordingly, bead diameters are from 0.5 to 10 microns, and 2 to 8 microns.

The film-forming composition also preferably contains an oxyethylene antistatic agent, present in an amount of up to 5%, preferably from 0.1 to 1% by weight of the film-forming polymer, and represented by the formula:

$$R-N\begin{matrix}(CH_2CH_2O)_xH\\(CH_2CH_2O)_yH\end{matrix}$$

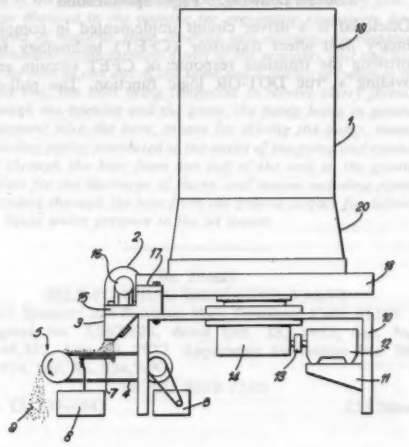
where R is a monovalent aliphatic radical containing from 12 to 22 carbon atoms and the sum of $x+y$ is from 2 to 5. The condensation product of tallow amine (1 mole) with ethylene oxide (2 moles) is a preferred compound. Other conventional additives such as dyes, pigments, lubricants, anti-oxidants, anti-blocking agents, surface-active agents, slip aids, gloss-improvers, prodegredants and ultra-violet light stabilizers may be included.

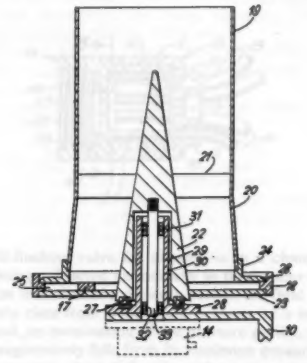
Using a combination of glass microbeads and an oxyethylene derivative, both as described above, I have observed a rapid development of the desired antistatic characteristics, as determined by measuring the surface resistivity of the film, which enables the film to be used promptly after the film production, particularly in packaging operations.

The resultant films are of excellent clarity and exhibit desirable surface resistivity (anti-static), blocking coefficient (anti-blocking) and coefficient of friction properties.

T952,011
POWDER FEEDER
Gerald Coote, Welwyn Garden City, and Peter Terrick Stainforth, Knebworth, England, assignors to Imperial Chemical Industries Limited, London, England
Filed Dec. 5, 1975, Ser. No. 638,281
Claims priority, application United Kingdom, Dec. 9, 1974, 53,084/74
Int. Cl.² B02C *23/02*
U.S. Cl. 241—186.4
4 Sheets Drawing. 15 Pages Specification

A rotary table feeder for cohesive powders is disclosed providing a volumetric output and comprising a rotary table **23**, a hopper **1** mounted in spaced relationship to the rotary table and connected so that it is rotatable with the table, and a stationary plough **17** located between the hopper and the table, and extending from the edge of the table, the table having a greater diameter than the hopper and an annular plate **24** being provided which is spaced-apart from the table **23**, the plate being fastened to and extending outwards from the base of the hopper so that it is rotatable with the hopper and table, a stationary skirt **18** provided around the periphery of the table and plate in sliding engagement therewith, the skirt having adjacent the end of the plough **17** an exit region through which the powder is delivered on rotation of the table and hopper.





By curving the plough into a spiral of less than one turn, shearing of the powder may be minimized. Slip between the powder and the table or plate is minimized by the provision on the table or plate of ribs inclined to the radii so that their outer extremities lag behind the inner portions.

In operation cohesive powders are consolidated into a uniform ribbon by the feeder, and may be reconstituted back to powder, e.g. by milling cutter. A constant weight feed of as low as 0.2 kg. $hr.^{-1}$ of cohesive powder may then be accurately obtainable by feeding the reconstituted powder to a weigh feeder which gravimetrically monitors the feed rate and adjusts the rate of table rotation accordingly. The disclosed powder feeder is particularly useful

in distributing small quantities of powder materials into another material, such as the addition of fire retardants, pigments or the like to plastics materials.

T952,012

VARIABLE IMPEDANCE PULL-UP DRIVER

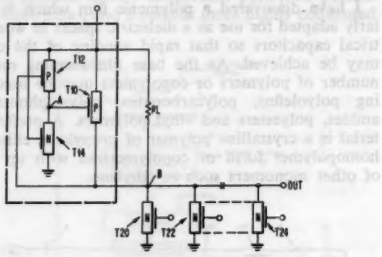
James M. Lee, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of abandoned application Ser. No. 483,510, June 27, 1974. This application Jan. 20, 1976, Ser. No. 650,812

Int. Cl.[2] H03K *17/04, 19/08, 19/34, 19/40*
U.S. Cl. 307—205

2 Sheets Drawing. 9 Pages Specification

Disclosed is a driver circuit implemented in complementary field effect transistor (CFET) technology for improving the transient response of CFET circuits and providing a true DOT-OR logic function. The pull-up circuit includes an inverter (transistors **T12** and **T14**) and a pull-up transistor **T10** placed in parallel with the conventional load impedance **RL** between a source of potential +V and the output node.



REISSUES

NOVEMBER 2, 1976

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,020

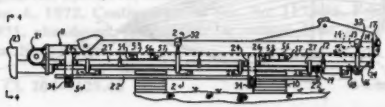
DRILLING APPARATUS

David L. Moody, Onconta, and James B. Loftis, Remlap, both of Ala., assignors to Joy Manufacturing Company, Pittsburgh, Pa.

Original No. 3,835,938, dated Sept. 17, 1974, Ser. No. 361,019, May 17, 1973. Application for reissue Dec. 20, 1974, Ser. No. 534,664

Int. Cl.² E21B *19/14*

U.S. Cl. 175—52 **15 Claims**



8. A drilling apparatus comprising: a generally horizontally extending drill guide frame; rotary drive means supported for reciprocating movement on said guide frame along the axis of rotation of said drive means; rack means carried by said guide frame for supporting a plurality of elongated drill steels with the longitudinal axes thereof being generally parallel to said axis of rotation and at least one such drill steel being below said axis of rotation; transfer means carried by said guide frame for removing said one such drill steel from said rack means and for subsequently transporting said one such drill steel upwardly into a position in alignment with said axis of rotation.

Re. 29,021

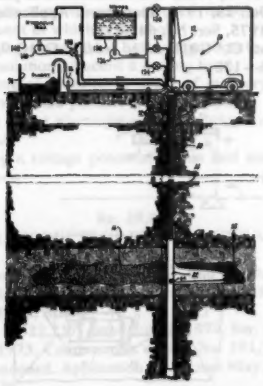
UNDERGROUND MINING SYSTEM

William R. Archibald, Tiburon, and John J. Gilbert, San Francisco, both of Calif., assignors to Marcona Corporation, San Francisco, Calif.

Original No. 3,797,590, dated Mar. 19, 1974, Ser. No. 324,168, Jan. 16, 1973. Application for reissue July 14, 1975, Ser. No. 595,506

Int. Cl.² E21C *45/00*

U.S. Cl. 175—213 **10 Claims**



7. Mining apparatus for operating through a subterranean bore extending from the exterior surface of the ground and into a subterranean body of friable material to be mined, comprising support means, a mining assembly carried by the support means within the bore and in the region of the body, the mining assembly being a compact structural unit dimensioned with respect to the dimensions of the bore to enable the same to be transported into the bore to a desired position within the body, the assembly unit including jet means for discharging a liquid jet stream into the body to impact the material in the body and pulp the same into a slurry, means for moving the jet means through at least a partial arc whereby a cavity is progressively formed in the body from which the slurry flows toward the assembly unit, the assembly unit having an opening located below the zone of operation of the jet means and disposed to receive the slurry flow, a grate disposed in the opening for preventing excessively large chunks of material from entering said opening, an elongated mechanical pump forming a part of the assembly unit and having an inlet at one end of the same and a discharge outlet at the other end, the inlet being connected to receive slurry flowing through the opening and the grate, the pump being in general alignment with the bore, means for driving the pump, means including piping connected to the outlet of the pump and extending through the bore from one end of the unit to the ground surface for the discharge of slurry, and means including piping extending through the bore from the ground surface for delivering liquid under pressure to the jet means.

Re. 29,022

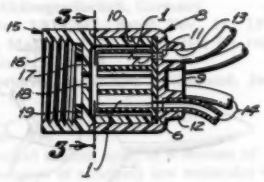
SELF-FLUSHING IRRIGATION VALVE

Lloyd Spencer, 220 Patrician Way, Pasadena, Calif. 91105

Original No. 3,767,124, dated Oct. 23, 1973, Ser. No. 245,312, Apr. 19, 1972. Application for reissue Dec. 20, 1974, Ser. No. 534,745

Int. Cl.² B05B *15/02*

U.S. Cl. 239—542 **22 Claims**



1. A self-flushing valve for disposition in a chamber, the chamber being subjected periodically to fluid under pressure whereby, on initiation of a pressure period, the fluid pressure progressively rises from a minimum pressure to a maximum pressure and, on termination of the pressure period, the fluid pressure progressively falls from its maximum pressure to the minimum pressure, the self-flushing valve comprising:

a. means forming an exit port in the chamber and, on flow of fluid therethrough, creating in its vicinity, a region of reduced pressure;

[b. and valve means including at least one flexible wall formed of elastomeric material having a first surface subjected to the fluid pressure in the chamber as supplied thereto, and an opposing surface exposed to the pressure as reduced in the vicinity of the exit port;

c. the wall being yieldably biased, when the difference between the chamber pressure and reduced pressure is below a predetermined value to occupy a position permitting flushing flow of liquid through the exit port and outlet;

d. the wall being movable, when the difference between said pressures exceeds said predetermined value, to throttle the exit port;

e. and the wall, when in its throttling position defining at least in part, a trickle passage forming an entrance to the exit port.]

b. and a tubular valve means including confronting wall elements defining an exit end and an entrance end displaced axially from the exit end, the interior of the valve means being exposed to said region of reduced pressure and including opposed wall elements, at least one of which is formed of elastomeric material adapted to occupy a first position forming with the other wall elements, an axially extending flush passage discharging through the chamber exit port, and a second position collapsed toward the other wall elements to form therewith a trickle passage of substantially reduced cross-sectional area;

c. the flexible wall element being responsive to increase of the pressure differential in the chamber and the flush passage above a predetermined value to cause movement of the wall element from its first position to its second position thereby converting the flush passage to a trickle passage;

d. the flexible wall element exerting a counterforce, when in its second position, tending to return the wall element to its first position, and being movable from its second position to its first position upon reduction of the pressure differential in the chamber and trickle passage below said predetermined value.

Re. 29,023

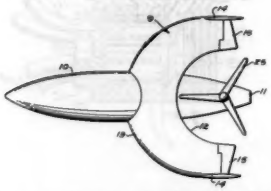
MEANS AND METHOD OF ROTOR AUGMENTED LIFT FOR AIRPLANES

Frank S. Malvestuto, Jr., Denver, Colo.

Original No. 3,372,891, dated Mar. 12, 1968, Ser. No. 500,719, Oct. 22, 1965. Continuation of Ser. No. 242,149, April 7, 1972, abandoned. Application for reissue Jan. 30, 1975, Ser. No. 545,495

Int. Cl.[2] B64C *27/26*

U.S. Cl. 244—6 **5 Claims**



1. In an aircraft: a generally horizontal lift producing wing [structure] *portion which produces a lifting force when moved through air, said lift producing wing portion* having a leading edge, a trailing edge and generally horizontally extending upper and lower surfaces, at least a portion of said trailing edge being configured to define a semicircle about a vertical axis [;], a power driven rotor mounted for rotation about said axis and having generally radial blades below said upper surface extending to close proximity to but *spaced* radially inwardly of said trailing edge and arranged to produce downward air flow at said trailing edge *said radial blades being rotatable in a plane which intersects said trailing edge*, the region rearwardly of said rotor and between said rotor and said trailing edge being free of air directing means whereby said rotor produces direct upward thrust on said aircraft and also creates a low pressure flow field across said upper surface and a high pressure flow field across said lower surface to thereby produce additional lift for said aircraft.

Re. 29,024

PARACHUTE

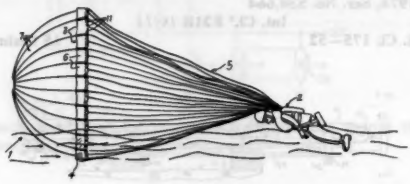
Brian Richard Arnold Reffell, Southall, England, assignor to The Walter Kidde & Company, Inc., Belleville, N.J.

Original No. 3,167,279, dated Jan. 26, 1965, Ser. No. 294,719, July 12, 1963. Application for reissue Feb. 12, 1974, Ser. No. 441,833

Claims priority, application United Kingdom, July 20, 1962, 28076/62; Nov. 20, 1962, 43901/62

Int. Cl.[2] B64D *17/02*

U.S. Cl. 244—145 **2 Claims**



1. A parachute comprising a canopy, and a series of circumferentially arranged pockets closely adjacent the peripheral edge of said canopy on the exterior thereof, each of said pockets consisting solely of a patch which is freely foldable when the parachute is unfolded and has side edges secured to said canopy, a lower end secured to said canopy closely adjacent the peripheral edge thereof and a detached upper edge, said side edges being secured to said canopy so that the top edge between the points of securement of said side edges is slightly greater in length than the distance between such points of securement of said side edges as measured on the surface of said canopy to render the upper edge slack to enable the pocket to fully open and to be filled with water only when an area of said canopy in which said pockets are located is dragged across a body of water.

Re. 29,025

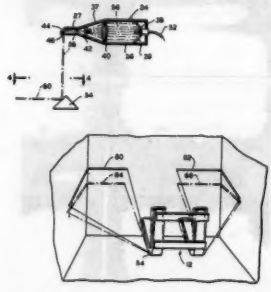
METHOD AND APPARATUS FOR DETERMINING ELEVATION

Howard C. Hansen, Battle Creek, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Original No. 3,854,820, dated Dec. 17, 1974, Ser. No. 441,683, Feb. 11, 1974. Continuation of Ser. No. 288,607, Sept. 13, 1972, which is a continuation-in-part of Ser. No. 84,708, Oct. 28, 1970, abandoned. Application for reissue Dec. 18, 1975, Ser. No. 642,033

Int. Cl.[2] G01B *11/26, 11/27;* **G01C** *9/00*

U.S. Cl. 356—138 **38 Claims**



1. In a vehicle *maneuverable by an operator* having a [manipulatable] load handling device *maneuverable both in ele-* handling device being so constructed and arranged as to

handling device being so constructed and arranged as to [provide a substantially collimated light beam and to] project [said] light [beam] from said load handling device as a diverging plane of light collimated in one dimension and in a predetermined attitude in relation to the load handling device such that a visual reference of *both* the [position] *elevation and attitude* of the load handling device appears in the form of a distinctly perceivable line of light on surfaces in the path of the projected diverging plane of light *both parallel and angular to the direction of travel of the vehicle.*

Re. 29,026

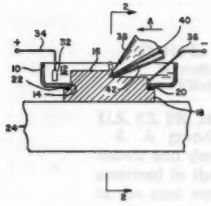
EMBRITTLEMENT MACHINING METHOD

Paul Rosenthal, Amherst, N.Y., assignor to Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y.

Original No. 3,852,176, dated Dec. 3, 1974, Ser. No. 336,115, Dec. 6, 1972. Continuation of Ser. No. 117,995, Feb. 23, 1971, abandoned. Application for reissue June 20, 1975, Ser. No. 588,913

Int. Cl.² C25F *3/00*

U.S. Cl. 204—129.46 **2 Claims**



1. Embrittlement machining method comprising the steps of:

1. placing in a container an electrolytic solution the main constituent of which is alcohol,
2. immersing a workpiece having a portion to be machined in said solution adjacent a cutting head,
3. supplying an embrittling agent of mercury or mercury amalgam to said portion of the workpiece,
4. placing a first electrode in said solution forming an anode, and
5. applying a voltage potential across said anode and said workpiece.

Re. 29,027

REACTION PRODUCTS OF POLYEPOXIDE AND EXCESS DI-2-OXAZOLINE

John A. Alford; Ben A. Tefertiller, Jr., and Donald A. Tomalia, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Original No. 3,822,237, dated July 2, 1974, Ser. No. 389,401, Aug. 17, 1973. Continuation of Ser. No. 191,786, Oct. 22, 1971, abandoned. Application for reissue May 2, 1975, Ser. No. 574,139

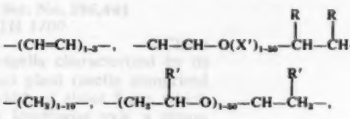
Int. Cl.² C08G *30/14*

U.S. Cl. 260—47 EN **5 Claims**

1. A process for preparing cured products which are particularly suited as self-adherent corrosion and chemical resistant coatings for metals, comprising

(A) preparing a curable, linear prepolymer by reaction at a temperature of between about 100° C. and 150° C. under autogenous pressure of (1) a polyepoxide having an average of more than one 1,2-epoxyaliphatic group per molecule with (2) at least 2 equivalents per equivalent of polyepoxide of a di-2-oxazoline of the formula

wherein X represents



where each R represents hydrogen or alkyl having from 1 to 4 carbon atoms; X′ represents ethyleneoxy or propyleneoxy; R′ represents hydrogen or alkyl having from 1 to 3 carbon atoms; X″ represents oxygen or sulfur; and R″ represents alkylene of from 2 to 20 carbon atoms, arylene of from 6 to 10 carbon atoms, or arylalkylene of from 7 to 15 carbon atoms, and

(B) curing said prepolymer by heating said prepolymer in the presence of curing amounts of an aromatic diisocyanate.

Re. 29,028

HEAT-CURABLE PULVERULENT COATING AGENT CONSISTING OF A MIXTURE OF COPOLYMERS CONTAINING GLYCIDYL GROUPS, DICARBOXYLIC ACID ANHYDRIDES AND CURING ANHYDRIDES

Themistoklis Katsimbas, Hamburg, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Original No. 3,919,347, dated Nov. 11, 1975, Ser. No. 474,529, May 30, 1974. Application for reissue Jan. 21, 1976, Ser. No. 651,164

Claims priority, application Switzerland, June 26, 1973, 9314/73

Int. Cl.² C08L *63/00*

U.S. Cl. 260—836 **6 Claims**

1. Pulverulent coating agent of a mixture of

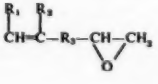
A. a copolymer of relatively low molecular weight, which contains glycidyl groups and is a copolymer of several ethylenically unsaturated compounds,

B. at least one dicarboxylic acid anhydride in an amount corresponding to 0.4–1.0 anhydride groups per epoxy group (glycidyl group) of the copolymer and

C. a curing accelerator in the form of an organic base,

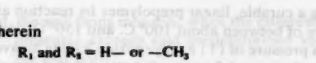
D. a flow control agent in an amount of at least 0.05 per cent by weight of the mixture, which agent is a polymer of molecular weight ($\overline{M}_n$) of at least 1,000 and has a glass transition temperature which is at least 50° C lower than the glass transition temperature of the copolymer (A), characterised in that the component (A) consists of 84 to 94 per cent by weight of copolymers containing epoxide groups and hydroxyl groups, which copolymers have Duran softening points of about 90°–120° C and are soluble in organic solvents and consist essentially of:

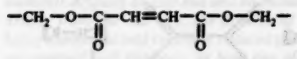
a. 6–24 per cent by weight of ethylenically unsaturated epoxide monomers with 6–12 carbon atoms, of the general formula

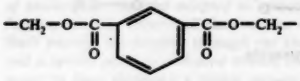


wherein

R_1 and R_2 = H— or $—CH_3$

R_3 =  or

 or

 or zero,

b. 4–20 per cent by weight of hydroxyalkyl esters of acrylic acid or methacrylic acid, with the hydroxyalkyl ester group being saturated and containing 2–4 C atoms,

c. 25–50 per cent by weight of methyl methacrylate and

d. 25–45 per cent by weight of other acrylic acid esters or methacrylic acid esters of aliphatic saturated monoalcohols with 1 to 8 carbon atoms,

the component (B) consisting of 6–16 per cent by weight of at least one dicarboxylic acid anhydride with melting points of about 60°–140° C, the component (C) [consisting of 0.15–1.8 per cent by weight of N',N'-bis-] *consisting of 0.5–1.8 per cent by weight of N',N'-bis-*(dimethylaminoisobutylidene)-melamine and the optional component (D) consisting of a flow control agent and other customary additives.

PLANT PATENTS

GRANTED NOVEMBER 2, 1976

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,971
NEOREGELIA PLANT

Paul de Coster, Ruitersdreef 1, Melle, B–9230 Belgium, and Adrien Simoens, Zonneveld 21, Merelbeke, B–9220 Belgium

Filed July 16, 1975, Ser. No. 596,441
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt. 88 1 Claim

1. A new cultivar, of Neoregelia characterized by its broader leaves; a more compact plant rosette comprised of some thirty leaves with a width of about 5 cm. which have in the middle along the lengthwise axis, a cream white stripe 2.5 to 3 cm. wide, sometimes with very fine green lines therethrough; inflorescence in the form of red coloring of about six bracts, while certain of said cream-white stripes of the lowermost leaves display a pink-red coloring.

3,972
ROSE PLANT

David L. Armstrong, Orange, Calif., assignor to Armstrong Nurseries, Inc., Ontario, Calif.

Filed Nov. 18, 1975, Ser. No. 633,008
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt. 20 1 Claim

1. A grandiflora rose plant substantially as herein shown and described, said plant being distinctively characterized in that its blooms are generally orange-red but, in the cool weather of spring and fall the blooms have deep-maroon petals which are edged with vermillion, the plant being further characterized in that it has, in combination, a vigorous and many-branched habit of growth, with many large prickles on stems and branches, and further in that its foliage manifests a better than average resistance to mildew than roses of similar type grown under parallel conditions; the flowers of said rose ranging from approximately 3¾ to 4½ inches in diameter, with from approximately 25 to 32 nearly round petals, plus 5 to 10 petaloids and upwards of 180 pistils in each flower.

PATENTS

GRANTED OCTOBER 2, 1976

ERRATA

For CLASS	See PATENT NO.
270–086	3,988,960
091–420	3,988,969
118–007	3,989,001
162–198	3,989,085
197–188	3,989,136
237–002 B	3,989,183
214–302	3,989,199
350–229	3,989,317
427–361	3,989,416
071–086	3,989,525
429–101	3,989,538
429–241	3,989,539
029–623.1	3,989,540
429–118	3,989,543
429–065	3,989,544
285–333	3,989,554
536–023	3,989,982
536–114	3,989,983
259–191	3,989,941
315–291	3,989,976
337–046	3,990,028
315–017	3,990,038

PATENTS

GRANTED OCTOBER 2, 1979

ERRATA

Page CLASS	Now PATENT NO.
270-086	3,988,966
001-420	3,988,900
118-007	3,989,001
162-198	3,989,083
197-188	3,989,136
217-002 B	3,989,183
214-302	3,989,199
320-229	3,989,317
427-361	3,989,416
071-086	3,989,522
429-101	3,989,538
429-241	3,989,739
029-625.1	3,989,940
429-118	3,989,943
429-06	3,989,944
285-233	3,989,954
336-022	3,989,982
336-114	3,989,983
299-191	3,989,941
315-291	3,989,770
317-046	3,990,029
315-017	3,990,033

PATENTS

GRANTED NOVEMBER 2, 1976

NOTE—Cross reference listings of applications published under the first and second Trial Voluntary Protest Programs are located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

3,988,780

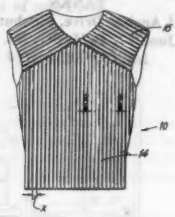
FABRICATION OF ARMORED FABRIC

Richard A. Armellino, 17 Forestdale Drive, Huntington, N.Y. 11743

Continuation-in-part of Ser. No. 710,407, March 4, 1968, abandoned. This application June 28, 1971, Ser. No. 157,555

Int. Cl.² F41H *1/02*

U.S. Cl. 2—2.5 **9 Claims**



1. A protective material comprising:
1. a plurality of layers of ballistic material,
2. said layers of material being formed of woven continuous filament synthetic yarns,
3. securing means extending along spaced continuous paths interconnecting said layers,
4. said securing means comprising a plurality of continuous uninterrupted stitches at least through a substantial portion of each path with each stitch interconnecting said layers together,
5. said paths being spaced a distance no greater than three-fourths of an inch and no less than one-eight of an inch.

3,988,781

SIDE BELTED SURGICAL GOWN OR THE LIKE

Phyllis J. Horan, Tucson, Ariz., assignor to Will Ross, Inc., Milwaukee, Wis.

Filed Dec. 24, 1975, Ser. No. 644,046

Int. Cl.² A41F *9/00*; A41D *13/00*

U.S. Cl. 2—338 **2 Claims**

1. A belt closure for a surgical gown or the like of the type wherein there is a vertical back opening line, an inside back panel with a free edge parallel to the opening line, and a closure panel adapted to be placed in a closed position where it extends across the opening line and overlaps the inside panel and presents a vertical free edge toward one side of the gown, said closure comprising: a back belt having a fixed end attached to the closure panel near its free edge; a side belt having a fixed end connected to said one side forwardly of the free edge of the closure panel when it is in closed position, said belts having free ends that are tyable at said one side of the gown; and a horizontally oriented storage sleeve for the side belt that is attached to said one side of the gown and that is open at both ends, the side belt having its fixed end near the sleeve and being folded within the sleeve so that it has a manually graspable loop portion extending through and beyond one end of the sleeve and so that its free end extends through and beyond the other end of the sleeve to be manually graspable.

3,988,782

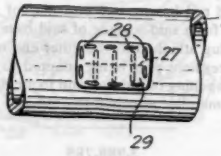
NON-ANTIGENIC, NON-THROMBOGENIC INFECTION-RESISTANT GRAFTS FROM UMBILICAL CORD VESSELS AND PROCESS FOR PREPARING AND USING SAME

Irving I. Dardik, 130 de Vriese Court, Tenafly, N.J. 07670, and Herbert Dardik, 806 Washburn, Teaneck, N.J. 07666

Continuation-in-part of Ser. No. 543,462, Jan. 23, 1975, which is a continuation-in-part of Ser. No. 376,948, July 6, 1973, Pat. No. 3,894,530. This application Apr. 1, 1975, Ser. No. 563,998

Int. Cl.² A61F *1/24*

U.S. Cl. 3—1 **55 Claims**



1. A flexible, hardened segment of a mammalian umbilical cord vessel in a shape other than that in which it occurs in nature, for use as a prosthesis in mammals, said segment having vanishingly low antigenicity and thrombogenicity.

3,988,783

PROSTHETIC COLLATERAL LIGAMENT

James T. Treace, Malibu, Calif., assignor to Richards Manufacturing Company, Inc., Memphis, Tenn.

Filed Jan. 21, 1976, Ser. No. 651,220

Int. Cl.² A61F *1/24*

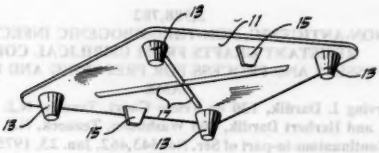
U.S. Cl. 3—1 **9 Claims**

1. Prosthetic ligament means for replacing a natural collateral ligament of the knee joint, said prosthetic ligament means comprising: bridge means for extending across the knee joint, said bridge means including a first end portion for being secured to bone structure of the lower end of the femur and including a second end portion for being secured to bone structure of the upper end of the tibia; first connector means for securing said first end portion of said bridge means to bone structure of the lower end of the femur; and second connector means for securing said second end portion of said bridge means to bone structure of the upper end of the tibia; at least one of said first and second connector means being pivotally attached to said bridge means.

3,988,784
PROTECTIVE SINK COVER

Marvin E. Reedy, West Covina, and Roy D. Shook, Mira Loma, both of Calif., assignors to Gary Harding and Patricia Garfield, both of Fullerton, Calif., part interest to each

Filed Aug. 1, 1975, Ser. No. 601,028
Int. Cl.² A47K 17/00; E03C 1/18
U.S. Cl. 4—1 5 Claims

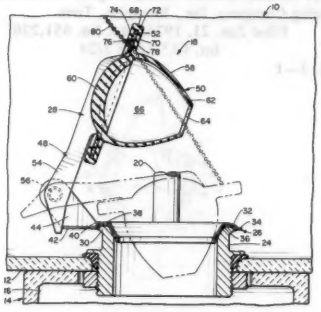


1. A protective cover for a sink comprising:
a base member having a surface thereof adapted to engage and mate with the peripheral lip of a sink opening whereby the peripheral lip and the opening of the sink are covered by said base member;
an elongated rod having one end thereof attached to and extending from said surface of said base member; and
a resilient plug attached to the other end of said elongated rod, said resilient plug being adapted to engage and seal the drain opening of the sink and to mechanically support said base member attached thereto.

3,988,785
VALVE SEAT AND CLOSURE MEMBER ASSEMBLY OF FLUSH VALVES FOR FLUSH TANKS AND THE LIKE

Adolf Schoepe, 1620 N. Raymond Ave., Fullerton, Calif. 92631, and Fredric E. Schmuck, 535 Century Drive, Anaheim, Calif. 92805

Filed Aug. 15, 1974, Ser. No. 497,524
Int. Cl.² E03D 1/34
U.S. Cl. 4—57 P 14 Claims

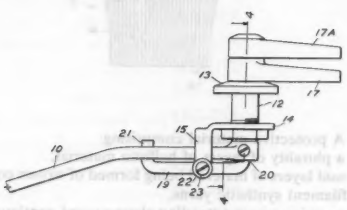


1. In a flush valve for flush tanks and the like, the flush tanks being of the type having a flush valve seat portion opening downwardly therethrough with an upper end portion having a generally upwardly facing annular end surface; the combination of: an integrated unitary valve seat and closure member assembly adapted for fabrication and assembly completely separate of said flush valve seat portion; the valve seat comprising a seat ring adapted to generally overlie the upwardly facing annular end surface of the flush valve seat portion, a mounting portion connected to and projecting generally transversely from said seat ring; the closure member comprising a guide portion hingedly connected to said mounting portion of said seat ring hingedly guiding said closure member in upwardly angled opening and downward closing hinged movements relative to said valve seat, a closure portion connected to said guide portion having an annular sealing surface facing and abuttingly sealing against said seat ring in a closure member downward closed position; sealing means in the form of a waterproof sealant adapted for installation between and for retaining said valve seat over said upper end portion of said tank flush valve seat portion, said sealant being the sole means required for retaining said separate integrated unitary assembly on said tank flush valve seat portion and through said valve seat said separate integrated unitary assembly supported in a flush tank.

3,988,786
AUXILIARY FLUSH VALVE MECHANISM FOR TOILET TANKS

Erick Lehfeldt, 54 Anchor Drive, Pittsburg, Calif. 94565

Filed June 17, 1975, Ser. No. 587,416
Int. Cl.² E03D 1/14
U.S. Cl. 4—67 A 1 Claim



1. A toilet tank flush valve operating mechanism for lifting the valve by a lever adapted for angular movement, a rotatable spindle having said lever fixedly mounted on the inner end thereof, an operating handle fixedly mounted on said spindle at the outer end thereof, upper and lower stops adapted to establish a range of angular movement, said lever being controlled relative to its range of angular movement, and wherein the improvement consists of a second lever adapted to coact with said first lever, said second lever consisting of a rod bent into a U shape, the corners being substantially sharply bent, and comprising a relatively long leg, forming a second spindle rotatably and axially mounted within said first spindle, and extending a relatively short distance beyond the outer end thereof, and a shorter leg passing under said first mentioned lever and being in close proximity to the under side thereof, and a second operating handle fixedly mounted on the outer projecting end of said second spindle, a boss at the remote end of said upper stop having a threaded aperture, an adjusting screw engaging the aperture of said boss, and being so positioned as to permit the range of travel of said second lever to be preset, thereby permitting control and restriction of said valve up to a point below the level of buoyancy thereof whereby the amount of discharge of water from a tank can be regulated.

3,988,787
PRESSURE DIFFERENTIAL VALVE FOR SWIMMING POOL

Donald D. Colee, P.O. Box 6617, Phoenix, Ariz. 85005

Filed May 29, 1975, Ser. No. 581,883
Int. Cl.² G05D 7/01
U.S. Cl. 4—172.17 2 Claims

2. Apparatus for controlling fluid flow between two pools of water comprising in combination:
first and second pools,
inlet and outlet ports for each of said pools,
a pressure differential valve comprising in combination:

a valve body defining a straight hollow passageway closed at both ends,

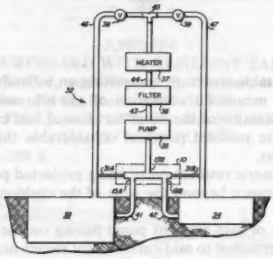
said valve body having a first pair of fluid inlet ports spacedly arranged in said valve body along said passageway, and a fluid outlet port positioned in said valve body along said passageway at a point between said pair of inlet ports,

a piston rod mounted in said valve body for movement longitudinally of said passageway,

three pistons mounted on said piston rod, one at each end thereof and one at a point adjacent said fluid outlet port,

a pair of control inlet ports to said passageway one formed in each end of said valve body,

a first pair of pipe means for connecting each of said pair of fluid inlet ports of said valve body to a different one of said outlet ports of said pools,



a second pair of pipe means for connecting said fluid outlet port of said valve body selectively to each of said inlet ports of said pools,

a third pair of pipe means for connecting each of said control inlet ports to a different one of said second pair of pipe means for controlling the fluid flow through said control inlet ports for regulating the movement of the associated piston juxtapositioned to said control inlet port for controlling the position of said three pistons to control fluid flow from said inlet ports to said valve body through said fluid outlet port,

a pump, heater and filtering means connected between said fluid outlet port of said valve body and said second pair of pipe means for conditioning fluid flow to each of said pools.

3,988,788

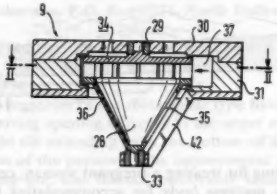
DEVICE FOR CLEANING A TOILET

Karl Aue, Leonhardplatz 2, 808 Furstenfeldbruck, Germany

Filed Dec. 29, 1975, Ser. No. 645,240

Int. Cl.² A47K *13/00, 13/30, 17/00*

U.S. Cl. 4—233 **22 Claims**



1. A device for cleaning a waterflushed toilet bowl and toilet seat comprising:

lid means positionally mountable in sealing engagement with the outer periphery of a toilet bowl for enclosing the toilet seat;

drying means secured to the underside of said lid means and stationed above the bowl for dispersment of a drying agent;

guide means disposed below said drying means for guiding the drying agent in cooperation with said lid means to the surface of the toilet seat for drying thereof; and

spray means secured to said lid means and disposed below said guide means for dispersment of a cleaning fluid, said spray means operable for spraying the toilet bowl and cooperable with said guide means for guiding the cleaning fluid onto the toilet seat for cleansing thereof;

3,988,789

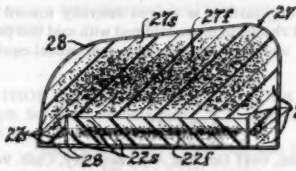
RESILIENT SEATS AND COVER LIDS THEREFOR FOR WATER CLOSETS

George W. Blount, Hamilton, Ohio, assignor to New Century Products, Inc., Middletown, Ohio

Filed Sept. 13, 1972, Ser. No. 288,730

Int. Cl.² A47K *13/02;* **B32B** *5/18*

U.S. Cl. 4—234 **21 Claims**



1. A resilient synthetic resin toilet seat comprising in combination a resilient preformed stiffening portion having an internal foamed core enveloped in an unfoamed self-skin and a cushioning portion having an internal foamed core enveloped in a tough but resilient self-skin, said cushioning portion unitarily extending from the top and sides of said stiffening portion with the portion of the self-skin of the cushioning portion overlying the portion of the self-skin of the top and sides of the stiffening portion being unitary with the self-skin of the top and sides of the stiffening portion and a continuous unitary outward self-skin of the seat being formed by other portions of the self-skin of the cushioning portion in combination with the other portions of the self-skin of the stiffening portion.

3,988,790

PORTABLE SUPPORT FOR A BED PATIENT

Milo F. Mracek, 22 Morwood Lane, Creve Coeur, Mo. 63141, and Ronald J. Bauer, 1935E Monfort, Florissant, Mo. 63033

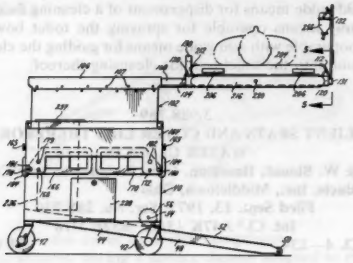
Division of Ser. No. 420,083, Nov. 29, 1973, Pat. No. 3,876,018, which is a division of Ser. No. 214,806, Jan. 3, 1972, Pat. No. 3,795,284. This application Feb. 12, 1975, Ser. No. 551,846

Int. Cl.² A61G *7/10*

U.S. Cl. 5—86 **14 Claims**

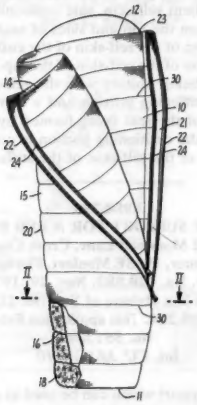
1. A portable support which can be used to carry a pad with a bed patient thereon and which comprises a wheel-equipped chassis, a supporting surface which normally overlies and is in register with said wheel-equipped chassis, said supporting surface having a length shorter than said pad and being dimensioned to be moved into position wherein it is disposed beneath said pad and hence is disposed beneath said patient, and cantilever-type guiding and supporting means which are mounted on said wheel-equipped chassis and which guide and support said supporting surface while permitting said supporting surface to be moved laterally away from said wheel-equipped chassis and into a cantilever-like position wherein it is disposed beneath said pad with said bed patient thereon, said wheel-equipped chassis and said cantilever-type guiding and supporting means enabling said supporting surface to

underlie and thereby hold and support said pad with said bed patient thereon when said supporting surface is in said cantilever-like position, said cantilever-type guiding and supporting means also guiding and supporting said supporting surface



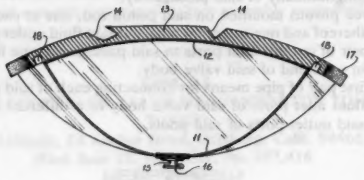
as said supporting surface is moved laterally toward said wheel-equipped chassis to move said pad with said bed patient thereon above and into register with said wheel-equipped chassis.

3,988,791
SLEEPING BAG
William N. Simon, 1441 Del Mar Ave., Berkeley, Calif. 94708, assignor to Snow Lion Corporation, Berkeley, Calif.
Filed Feb. 10, 1975, Ser. No. 548,519
Int. Cl.² A47G 9/00
U.S. Cl. 5—343 **3 Claims**



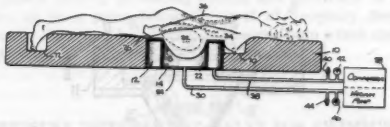
1. A sleeping bag for backpacking and the like, having a unitary construction comprising inner and outer shells open at one and the same side, tubular baffles of nylon mesh for receiving and retaining the insulating material and holding the inner and outer shells in spaced relation, insulating material in said tubular baffles, and a pair of continuous slide fastening means along the open side for closing the open side, said fastening means being off-set with respect to each other providing a dead air space there between so as to prevent leakage through the closure means and keep the heated air in and the cold air out of the interior of said sleeping bag.

3,988,792
INFLATABLE STRUCTURE FOR PRODUCING LOW RELIEF FIGURES
Charles Klein, Sierra Madre No. 110, Mexico City, Mexico
Filed July 7, 1975, Ser. No. 593,588
Int. Cl.² A47C 27/08
U.S. Cl. 5—365 **3 Claims**



1. An inflatable structure comprising an inflatable cushion having valve means for admission of gas into said cushion, wherein at least one of the outer surfaces of said cushion has an elastomeric resilient panel of considerable thickness attached thereto;
said elastomeric resilient panel being projected peripherally some distance beyond the edge of the cushion forming a flange;
said flange of said resilient panel having on the same wall thereof attached to said cushion, slot means near the edge thereof;
said rigid support plate having rib means near the edges thereof;
said rib means engaging said slot means of said flange coupling fixedly said inflatable cushion to said rigid support;
said elastomeric resilient panel having a representation printed thereon;
slit means forming lines of said representations printed on said resilient panel;
said slit means having printed portions on their inner surfaces thereof;
said printed representations on said inner surfaces of said slit means being visible when said structure is inflated providing a low relief figure.

3,988,793
DEVICE FOR PREVENTING AND TREATING TOXEMIA IN PREGNANT WOMEN
M. Maurice Abitbol, 41 Allenwood Road, Great Neck, N.Y. 11023
Filed Sept. 16, 1975, Ser. No. 613,812
Int. Cl.² A47C 27/08
U.S. Cl. 5—365 **12 Claims**



1. Apparatus for treating a pregnant woman, comprising:
a resilient mattress body for accommodating the woman lying in the prone position:
an inflatable ring located in an opening in the central portion of said mattress body, said inflatable ring forming a chamber which is open at the top surface of the mattress body and is of sufficient size and depth for receiving the expanded abdomen of said woman with the abdominal wall in a free floating condition in said chamber:

fluid pressure supply means for filling said inflatable ring to a pressure that provides sufficient body support for the heavier weight around the woman's midsection;

a bottom wall for enclosing the bottom of said inflatable ring such that said chamber is completely enclosed by the skin of the woman around the area adjacent the abdomen,

a vacuum pump means connected to said chamber for producing a vacuum or partial vacuum therein; and

fluid pressure supply adjustment means connected to said fluid pressure supply means for setting the fluid in said inflatable ring to a pressure which maintains the abdominal wall out of contact with said bottom wall of said chamber; whereby the pregnant woman can rest or sleep comfortably in the prone position on said mattress body substantially without the pressure of the pregnant uterus and the abdominal wall on the abdominal aorta.

3,988,794

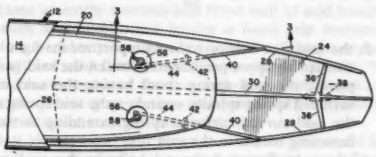
SURFBOARD WITH RESILIENT TAIL

Robert C. Tinkler, and Michael R. Tinkler, both of 1221 Parker Place, Pacific Beach, Calif. 92109

Filed June 2, 1975, Ser. No. 582,668

Int. Cl.[2] A63C *15/00*

U.S. Cl. 9—310 E **13 Claims**



1. A surfboard comprising:

a. a forward hull portion having a deck, a bottom, and siderails;

b. a rear hull having:

i. a rigid upper rear deck defining a continuation of the deck of said forward portion and being substantially non-yielding;

ii. a resilient bottom deflection panel defining a continuation of the bottom of said forward portion and extending rearwardly beneath said rear deck and being upwardly deflectable independently of said rear deck such that a surfer can stand on said surfboard with one foot on said rear deck and said deflection panel can deflect upwardly beneath said rear deck without causing a similar deflection therein.

3,988,795

LIFE PRESERVER

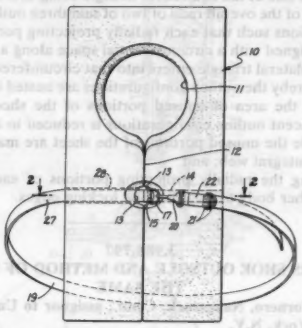
James H. Robertson, P.O. Box 9551, North Hollywood, Calif. 91609

Filed Dec. 29, 1975, Ser. No. 644,575

Int. Cl.[2] B63C *9/10*

U.S. Cl. 9—338 **8 Claims**

1. In a life preserver of the rectangular type having a circular neck receiving opening adjacent to the upper end thereof, with a straight slit extending from the bottom of the opening to the bottom of the preserver, the improvement comprising a strap having one end thereof immovably secured to the portion of said preserver on one side of said slit, at least one first fastening member mounted on said strap adjacent to said slit, the portion of said strap on the opposite side of said fastening member slidably extending through an opening in the portion of said preserver on the opposite side of said slit, said strap having an elongated portion extending substantially beyond said preserver, said elongated portion being adapted to extend around the body of a wearer, and a second fastening member carried by said elongated portion, said second fastening member being adapted to engage said first fastening member to secure said strap and hold said preserver on the body of a wearer.



3,988,796

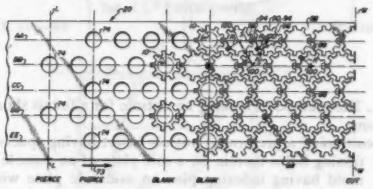
METHOD OF MAKING TOOTHED LOCK WASHERS

Rudolph Schmidt, Mountainside, N.J., assignor to Triangle Tool Company, Union, N.J.

Filed Aug. 13, 1975, Ser. No. 604,101

Int. Cl.[2] B21D *53/20*

U.S. Cl. 10—86 B **5 Claims**



1. In a method of making toothed lock washers from sheet material, each washer having a generally annular body portion including a center and a plurality of teeth projecting radially to an overall radius, said teeth being spaced circumferentially essentially equidistant from one another and twisted relative to the body portion to provide locking edges spaced axially from at least one surface of the body portion, the circumferential width of the spaces between adjacent teeth being at least as great as the circumferential width of the teeth themselves, the steps of:

blanking, from the sheet, a plurality of washer bodies, each leaving in the sheet an outline configuration which includes a number of radially projecting portions spaced circumferentially essentially equidistant from one another and corresponding to said teeth, with the circumferential spaces between the radially projecting portions having a circumferential width corresponding to the circumferential width of the spaces between adjacent teeth, said number of radially projecting portions being an odd whole number multiple of three;

simultaneous with, and as a result of, said blanking, positioning the washer body outline configurations relative to one another in the sheet such that three adjacent washer body outline configurations are located with the centers of the outline configurations positioned essentially at the vertices of an equilateral triangle and are oriented relative to one another such that a radially projecting portion of one of said outline configurations is aligned with a circumferential space between adjacent projecting por-

tions of another of said outline configurations generally along a side of the equilateral triangle with the length of each side of the equilateral triangle being shorter than the sum of the overall radii of two of said three outline configurations such that each radially projecting portion which is aligned with a circumferential space along a side of the equilateral triangle enters into that circumferential space, whereby the outline configurations are nested in the sheet and the area of unused portions of the sheet between adjacent outline configurations is reduced to a minimum while the unused portions of the sheet are maintained in an integral web; and

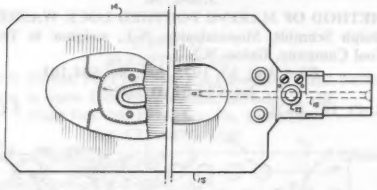
twisting the radially projecting portions of each blanked washer body to establish the locking edges.

3,988,797

TENNIS SHOE OUTSOLE AND METHOD OF MAKING THE SAME

Roger Tornero, Naugatuck, Conn., assignor to Uniroyal Inc., New York, N.Y.

Filed Jan. 8, 1975, Ser. No. 539,368
Int. Cl.² A43D *9/00*; A43B *23/28*
U.S. Cl. 12—142 RS **2 Claims**



1. The method of making an outsole for a tennis shoe comprising:

positioning a preformed outsole insert having spaced positioning holes therein on a sole plate of an outsole cavity mold having indexing pins on said sole plate with said indexing pins in corresponding holes of said insert, said indexing pins having knobs at the ends thereof and said holes of said insert being slightly shorter than said pins, the step of positioning said insert comprising snapping said insert onto said pins;

closing said mold;

and injection - molding an outsole adherent to said insert in said mold.

3,988,798

SELF ADJUSTING BRUSH ARM ASSEMBLY

Henry J. Kratt, 6633 S. Birmingham, Tulsa, Okla. 74136

Filed July 16, 1975, Ser. No. 596,230
Int. Cl.² B08B *9/02*
U.S. Cl. 15—88 **4 Claims**

1. In a pipe cleaning machine, in combination, a sprocket having an opening for the passage of a pipe therethrough and with at least a first and second brush arm assembly mounted on the said sprocket;

a. each of the said first and second brush arm assemblies comprising a first movable bracket and second bracket,

b. the said first movable bracket having support means for at least one cleaning brush suitable for removing rust and scale from pipe surfaces,

1. the said first bracket having a first and a second bolt extending through the face surfaces of the said first movable bracket to furnish support means for a first and a second movable web member,

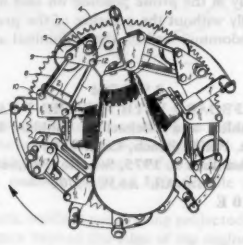
2. the said first and second bolts being positioned at each of two corners of the said first movable bracket,

3. the said first bracket having an extension attached thereto with fastening means for securing one end of a curved surfaced spring in an extended position from the said first brush arm assembly to the said second brush arm assembly, the said spring furnishing constant pressure on the said cleaning brush,

c. the said second bracket being attached to the said sprocket by means of a circular rod,

1. the said second bracket having two face plates spaced apart from each other and held in spaced relationship by the said circular rod, a first bolt and a second bolt,

2. the said circular rod, the first and second bolts being positioned at each of the corners of the said face plates,



3. the said first bolt providing support means for a rotatable spring spool positioned between the said two face plates, the said spring spool having the said curved surfaced spring spirally wound on the said spring spool, the said curved surfaced spring extending to the said fastening means in the said first bracket,

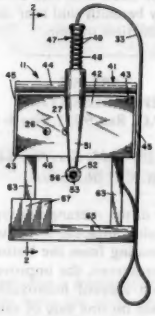
4. the said first and second bolts in the said second bracket each supporting the said first and second movable web member respectively, the said web members extending to the said first bracket and providing connection means between the said second bracket and the said first bracket in each of the said brush arm assemblies.

3,988,799

BODY SCRUBBING APPARATUS

Hubert E. Strickland, 1417 Perry St., Chesapeake, Va. 23324

Filed Feb. 27, 1975, Ser. No. 553,470
Int. Cl.² A47K *7/04*; A46B *13/02*
U.S. Cl. 15—97 R **4 Claims**



1. Apparatus useable by a bather for facilitating the scrubbing of the back, comprising:

a frame assembly connected to a wall partially enclosing an area adapted to be utilized by a person for the bathing of the body, said frame assembly carrying an electric motor as well as means for controlling the operation of said

motor, said frame assembly further carrying means for the mounting of a housing thereon;

a substantially water tight housing interconnected with said means for the mounting of a housing carried by said frame assembly, said housing having an upper wall overlying said frame assembly and a lower wall underlying said frame assembly, said housing further having a first end wall disposed adjacent a first end of said frame assembly and a second end wall disposed adjacent a second end of said frame assembly, said housing upper, lower, and end walls each having an edge substantially abutting said wall carrying said frame assembly for substantially preventing the passage of water from the exterior to the interior of said housing along said edges of said housing walls, said housing further having a front wall integrally interconnected with said upper, lower, and end walls thereof in a plane remote from said wall carrying said frame assembly, said front wall of said housing having at least one aperture formed therethrough, said means for controlling said electric motor carried by said frame assembly including at least one control element extending substantially snugly through said aperture provided in said housing front wall for manual manipulation exteriorly of said housing;

a flexible shaft element connected to the shaft element of said electric motor and extending outwardly from said housing through a notch extending from the edge of a wall thereof substantially abutting said wall carrying said frame assembly towards said front wall of said housing;

a brush arm component having a hand grip section, an elongated body section, and a head section; a terminal length of said flexible shaft element most remote from said motor entering the free end of said brush arm component hand grip section and proceeding therethrough towards said head section thereof;

a shaft element carried by said brush arm component head section and partially extending therefrom; said flexible shaft element being interconnected with said shaft element carried by said brush arm component head section to rotatably drive the same as said flexible shaft element is rotated by the operation of said motor; and

a scrubbing element readily detachably interconnected with said shaft element carried by said brush arm component head section including a disk shaped body of scrubbing material adapted to be rotated by the operation of said motor.

3,988,800

CASTER FOR FURNITURE AND THE LIKE

Herbert Sachser, Wermelskirchen, Germany, assignor to Albert Schulte Sohne KG, Wermelskirchen, Germany

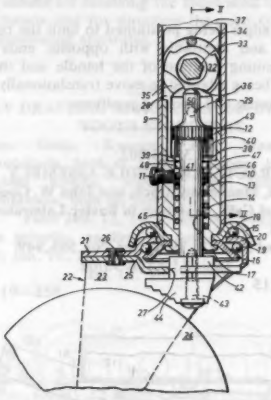
Filed Apr. 17, 1975, Ser. No. 569,179

Claims priority, application Germany, May 8, 1974, 2422154

Int. Cl.[2] B60B *33/00*

U.S. Cl. 16—35 R **15 Claims**

1. A caster for furniture and the like, comprising a ground-engaging rolling member; an upright mounting fork rotatably mounting said rolling member; support means supporting said fork for turning about an upright axis, including a support element projecting upwardly from said mounting fork and formed with an upright passage, and a pin received in said passage for relative longitudinal shifting; and arresting means for arresting said fork against turning about said upright axis, including a first set of elongated teeth on said support element, a second set of elongated teeth on said pin, each of said teeth being equidistantly spaced from said upright axis over the entire length thereof, and shifting means for relatively



longitudinally shifting said pin in said passage to thereby bring said sets of teeth into and out of engagement with one another.

3,988,801

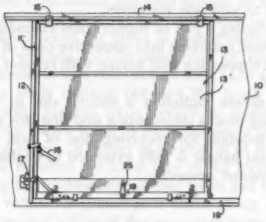
LIFTING MECHANISM FOR SLIDING DOORS

John W. Hutchison, Crown Point, Ind., assignor to Pullman Incorporated, Chicago, Ill.

Filed July 28, 1975, Ser. No. 599,791

Int. Cl.[2] E05D *13/02*

U.S. Cl. 16—99 **3 Claims**



1. In a sliding door having a vertical door panel and a track positioned below the door for slideably supporting the door, a door lifting mechanism comprising:

a pair of levers pivotally connected on generally horizontal axes to the door in horizontally spaced relation,

a roller journalled on each lever,

a cam rotatably mounted on the door,

a handle connected to the cam,

horizontally extending actuating links pivotally connected to the respective levers for pivoting the same and moving the rollers into and out of engagement with the track,

a vertical thrust plate connected to each of the links and positioned such that the thrust plates extend in an overlapping relationship,

said thrust plates each having quadrilaterally shaped openings admitting the cam therein,

said openings being defined by vertical and transverse edges providing cam engaging surfaces,

a flat cam member having opposite sides and end portions dimensioned to fit between the transverse edges of the respective openings,

said dimension being greater than the spacing between the vertical edges of said openings

said cam member being adapted to rotate within said openings and to ride along said cam surfaces on said transverse edges attendant to imposing tension forces on the links, and

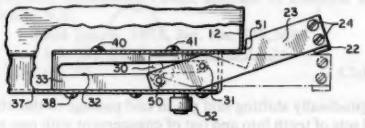
said vertical edges being positioned to limit the rotation of said cam and abuttable with opposite ends thereof, thereby limiting rotation of the handle and the handle thereafter being adapted to move translationally with the door to closing and opening positions.

3,988,802

RETRACTABLE HANDLE ASSEMBLY

James G. Bruni, Manhattan Beach, and John W. Goodin, Long Beach, both of Calif., assignors to Baxter Laboratories, Inc., Deerfield, Ill.

Filed July 18, 1975, Ser. No. 596,949
Int. Cl.² A47B *95/02*
U.S. Cl. 16—115 **9 Claims**



1. A retractable handle assembly for use in conjunction with a housing comprising, in combination:

a generally U-shaped handle including a grippable member and a pair of side members attached to respective ends of said grippable member;

a pair of handle mounting blocks disposed on said housing adjacent respective ones of said side members, said blocks each including a first slot extending generally parallel to said side members;

means including a pair of support pins extending from each of said side members into respective ones of said slots for slidably supporting said handle with respect to said housing; and

indexing means including a second slot in each of said mounting blocks intercepting said first slot at a predetermined location for receiving one of said support pins when said handle is fully extended to enable said handle to be pivoted upwardly.

3,988,803

APPARATUS FOR CENTERING SLAUGHTERED CARCASSES CUT OPEN FOR CLEAVING

Karl-Erik Ingemar Hamark, Varberg, Sweden, assignor to Meat Industry Technique mit Aktiebolag, Sweden

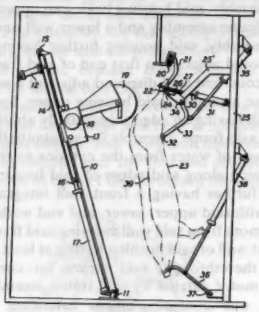
Filed Feb. 14, 1975, Ser. No. 550,056
Claims priority, application Sweden, Feb. 21, 1974, 7402271
Int. Cl.² A22B *5/20*
U.S. Cl. 17—23 **3 Claims**

1. An apparatus for centering cut-open slaughtered carcasses to be cleaved, in particular slaughtered carcasses of pigs where means are provided for suspending the carcass from its hind legs, comprising a stationary horizontal first support rail, a first member for engaging the hind legs of the carcass for symmetrically pressing said hind legs against said stationary horizontal first support rail for initially centering the carcass; means for preventing rotation of the carcass;

a second member for engagement with the head end of the carcass, said second member being pivotally movable in a verticle plane along a centering line and being non-movable in a horizontal direction;

power means for moving said second member in a verticle plane along the centering line, and

said means for preventing the rotation of the carcass comprises a second support rail adapted to be displaceable towards the belly of the carcass between the head end and



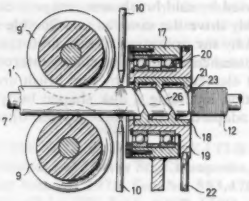
the hind portion of the carcass and which is parallel to said first support rail.

3,988,804

METHOD FOR SHIRRING CASINGS

Richard Regner, and Gerd Schug, both of Mainz-Bretzenheim, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Germany

Filed Sept. 21, 1972, Ser. No. 290,816
Claims priority, application Germany, Sept. 23, 1971, 2147498; June 26, 1972, 2231144; June 26, 1972, 2231145
Int. Cl.² A22C *13/02*
U.S. Cl. 17—45 **8 Claims**



1. A method of shirring cylindrical casings particularly sausage casings, comprising moving the casing in the direction of its longitudinal axis and shirring against a force opposing its movement, the force used for shirring being applied concentrically of the axis of the casing by at least one element which moves about the longitudinal axis of the casing.

3,988,805

METHOD FOR SHUCKING SHELLFISH

Roger C. Martin, Cocoa Beach, Fla., assignor to Edgar E. Griffis, Brevard County, Fla., a part interest

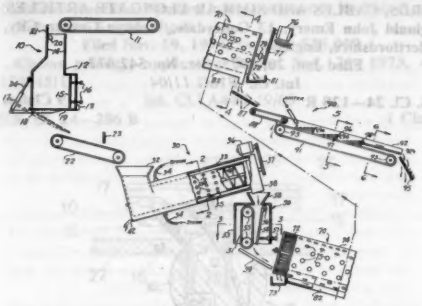
Division of Ser. No. 297,309, Oct. 13, 1972, abandoned. This application Jan. 7, 1975, Ser. No. 539,045
Int. Cl.² A22C *29/04*
U.S. Cl. 17—48 **5 Claims**

1. The method of processing shellfish to render them fit for human consumption comprising the steps of:

a. subjecting the outer surface of said shellfish to steam for cleansing and sterilizing said surface;

b. subjecting the outer surface of said shellfish to a shearing force by passing said shellfish between a travelling belt and a stationary plate for freeing the meat from the shell;

c. separating the meat from said shells; and



d. eviscerating the meat by feeding the meat with viscera attached onto a moving conveyor belt and passing said viscera but not said meat under rollers rotating in the same direction as the movement of said belt.

3,988,806

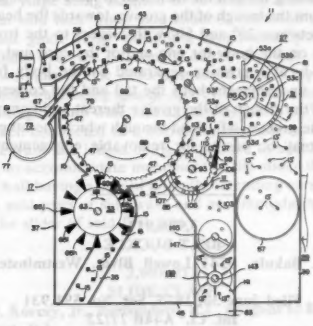
APPARATUS FOR CLEANING SEED COTTON

Woodrow W. Bledsoe, 2775 Dalewood, Memphis, Tenn. 38127

Filed June 30, 1975, Ser. No. 592,068

Int. Cl.[2] D01G *1/00*

U.S. Cl. 19—203 **13 Claims**



1. Apparatus for segregating trash from seed cotton, said apparatus comprising framelike housing means, a prime mover for rotatably driving certain structure of said apparatus, a primary saw drum for engaging and holding the seed cotton, said primary saw drum being journaled to said housing means and being operably coupled to said prime mover for rotaton in a predetermined direction about a horizontal axis, entry duct means disposed adjacent said primary saw drum for admitting the comingled seed cotton/trash into said housing means, pnuematic conveyor means for moving the comingled seed cotton/trash into said entry duct means, beater means for arresting and agitating the comingled seed cotton/trash and for directing at least a portion thereof toward said primary saw drum, said beater means being journaled to said housing means and being operable coupled to said prime mover for rotation in a predetermined direction about a horizontal axis, first outlet duct means leading outwardly from said housing means and being disposed downstream of said beater means for discharging from said housing means the rushing air being moved by said pneumatic conveyor means and at least a first portion of the segregated trash, first grid section means disposed adjacent said beater means for separating said first portion of the trash from the seed cotton as the rushing air passes outwardly therethrough, doffing means for removing the clean seed cotton from said primary saw drum, and seed cotton discharge duct means leading outwardly from said housing means for receiving the clean seed cotton from said doffing means and for directing the seed cotton to certain further processing apparatus.

3,988,807

ROTARY DRAFTING APPARATUS HAVING IMPROVED TOOTH STRUCTURE

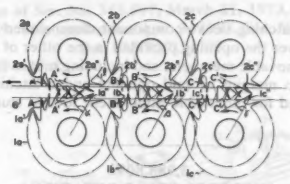
Shigekazu Ueda, Kasugai, and Masakazu Shino, Yamatotakada, both of Japan, assignors to Chubu Seiko Kabushiki Kaisha, Kasugai and Masakazu Shino, Yamatotakada, both of, Japan

Filed Jan. 13, 1975, Ser. No. 540,683

Claims priority, application Japan, Jan. 16, 1974, 49-7874[U]; Jan. 16, 1974, 49-7875[U]

Int. Cl.[2] D01H *5/74*

U.S. Cl. 19—258 **1 Claim**



1. A rotary drafting apparatus for use in a spinning machine, including a pair of back rollers coactively rotatable for guiding therethrough sliver to be drafted, a pair of front rollers coactively rotatable for drafting the guided sliver, and plural pairs of control rollers interposed in cascade between said back rollers and said front rollers and each formed on its circumference integrally with a multiplicity of teeth coactively combing the guided sliver when the latter is passed therethrough, the improvement wherein the foremost pair of control rollers positioned closest to said front rollers have such a tooth structure that the angle defined between the tooth face of the leading side and a tangent taken toward the trailing side from the leading edge of the tooth to the deddendum circle of each of the control rollers, is preset at a value of at least 90°, and that the angle between the tooth face of the trailing side and a line dividing the leading edge of said tooth and the center of said control rollers, is preset at a value of up to 20°, and wherein the control rollers of the remaining pairs have such a tooth structure that the angle defined between the tooth face of the leading side and a tangent taken toward the trailing side from the leading edge of the tooth to the deddendum circle of each of the control rollers is preset at a valve of less than 80°.

3,988,808

READILY MOUNTED SEPARABLE FASTENER

L. Richard Poe; Clifford A. Davis, and William R. Bourne, Jr., all of Placentia, Calif., assignors to Hartwell Corporation, Placentia, Calif.

Filed Aug. 8, 1975, Ser. No. 603,132

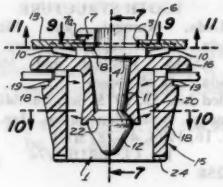
Int. Cl.[2] E05C *7/00;* **A44B** *21/00*

U.S. Cl. 24—73 P **10 Claims**

1. A separable fastener the components of which are arranged for mounting in confrontable rectangular openings provided in thin wall portions of a pair of relatively movable members, said separable fastener comprising:

a. a stud component including a base portion dimensioned to cover the rectangular opening provided in one of the relatively movable members, an opposing pair of yieldable side tabs, an opposing pair of yieldable latch elements in registery with the side tabs, the areas encompassed by the side tabs and latch elements being equal to each other and the area of the opening in the movable

member and being movable between a position in registery with the opening and position at right angles thereto wherein the extremities of the side tabs and the extremities of the latch elements frictionally engage opposite surfaces of the movable member to retain the base portion in place; the stud component also including a stud projecting axially from the base portion;



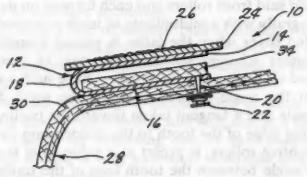
b. and a latching sleeve component dimensioned to overly and cover the opening provided in the other of said relatively movable members, and including means for attachment to margins of said opening and a latching sleeve arranged for removable attachment to said stud component.

3,988,809

SHOULDER STRAP RETAINER

Robert B. Powell, and Elizabeth S. Powell, both of 3000 Grand Ave., Des Moines, Iowa 50312

Filed Feb. 28, 1975, Ser. No. 554,393
Int. Cl.² A44B 9/00
U.S. Cl. 24—85 R **1 Claim**



1. In combination, a garment having a shoulder portion, said shoulder portion having interior and exterior surfaces and inner and outer portions, and a pivotally mounted self-aligning shoulder strap retaining means secured to the exterior surface of said shoulder portion, said retaining means comprising:

a base member having inner and outer end portions on the exterior surface of said shoulder portion and terminating in a stop means on the outer end thereof, said base member being adapted to engage and hold a strap from movement outwardly from said shoulder portion; the inner and outer ends of said base member being positioned on the inner and outer portions, respectively, of said shoulder portion;

a post means secured to said base member and pivotally extending downwardly through the inner portion of said shoulder portion and through the interior surface of said shoulder portion; said post means being straight and terminating in a sharpened end beyond the interior surface of said shoulder portion;

fastening means on said post means inside said garment underneath said shoulder portion and adjacent the interior surface thereof; and

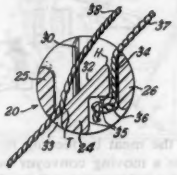
said post means being secured to the inner end of said base member whereby the weight exerted on a shoulder strap held by said stop means will retain the position of said base member on said shoulder portion.

3,988,810

JAMMING CLEAT FOR RELEASABLY HOLDING ROPES CORDS, CABLES AND SIMILAR ELONGATE ARTICLES

Reginald John Emery, 13 Coneydale, Welwyn Garden City, Hertfordshire, England

Filed Jan. 20, 1975, Ser. No. 542,472
Int. Cl.² F16G 11/04
U.S. Cl. 24—128 R **9 Claims**



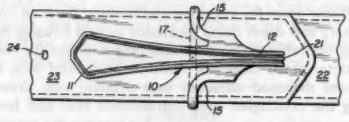
1. A jamming cleat for securing both ends of a cord, comprising a body having a head and a tail, a pair of walls integral with the body and extending away therefrom at a V-angle of between 8° and 20° to form a groove for reception of the cord, which groove extends in the direction from the head to the tail and internally terminates in a longitudinal trough at the apex of the V-angle, and which trough extends from the head to the tail, there being formed on each wall at least one ridge which extends from the trough of the groove, towards the head, at an angle of between 20° and 50° with respect to the trough, an anchorage on the body for one end of the cord and, formed on the body at a position separated by the body from the anchorage and adjacent both the tail and the corresponding portion of the trough of the groove thereat and communicating with the groove, a fairlead through which the other end of the cord may be passed for removable engagement in the groove.

3,988,811

BELT BUCKLE

Melvin S. Bakula, 8541 Lowell Blvd., Westminster, Colo. 80030

Filed June 30, 1975, Ser. No. 591,931
Int. Cl.² A44B 11/22
U.S. Cl. 24—186 **3 Claims**



1. A one piece belt buckle embodying a table fork comprising an integral handle, shank and plurality of tines extending longitudinally, said buckle comprising

a. a face member formed by the handle, part of said shank of said fork bent to underlie the face member,

b. belt engaging means consisting of two of said table fork tines extending laterally and underneath said face member and extending rearwardly near the junction of the tines and shank to form a loop-like configuration for receiving a belt, and

c. a hook member on another tine of said fork for engaging a hole in a belt.

3,988,812

SLIDER FOR ADJUSTABLE FASTENING DEVICE

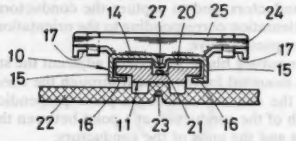
Yoshihiro Kanzaka, Nyuzen, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Nov. 19, 1974, Ser. No. 525,069

Claims priority, application Japan, Nov. 21, 1973, 48-134845[U]

Int. Cl.² A44B *19/00*

U.S. Cl. 24—206 B 1 Claim



1. In an adjustable fastening device of the type having a slider attached to a first part and adapted to be slidably mounted astride a rack attached to a second part so as to be releasably locked in any selected position thereon for adjustably fastening said first and second parts together, wherein said slider includes a body having a top wall, and wherein said rack includes two rows of intersticed teeth which rows are spaced apart from each other by a groove extending substantially along the full length of said rack, the improvement wherein said slider further comprises a guide ridge formed centrally on the internal surface of said top wall of said body, said guide ridge being adapted to be slidably received in said groove in said rack when said slider is mounted astride the latter said guide ridge extending longitudinally along and substantially over the full length of the top wall, said slider having two pairs of side walls connected to said top wall, said pairs of side walls being spaced-apart from each other longitudinally along the top wall, and a plurality of inwardly directed ledges each connected to a corresponding side wall, said top wall, side walls and ledges being positioned to slidably engage the rack to accommodate movement of the slider therealong, said top wall having a pair of laterally extending ears, disposed between said pairs of side walls and accommodating connection to the slider of said first part.

3,988,813

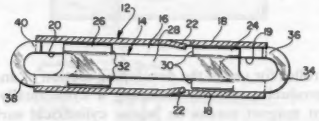
SLIDE CLASP

Joseph J. Korcey, Jr., Portsmouth, R.I., assignor to KMC, Inc., Newport, R.I.

Filed May 19, 1975, Ser. No. 579,019

Int. Cl.² A44B *13/00*

U.S. Cl. 24—238 5 Claims



1. A clasp for coupling the ends of a chain, comprising a hollow sleeve having open ends, a slide member mounted for sliding movement in said sleeve and having hook portions formed on the opposite ends thereof, said slide member including end portions between which a central reduced portion is formed, the junction of the central portion with said end portions defining spaced annular shoulders, one end of said chain being secured to one of said hook portions, the hook of which is substantially concealed within said sleeve to permanently lock said one end of said chain to said one hook portion, at least one detent formed on said sleeve and extending inwardly thereof between said annular shoulders for engagement by a shoulder upon longitudinal sliding movement of said slide member in a first direction, wherein further longitudinal movement of said slide member in said first direction is prevented and said one hook portion is prevented from being moved outwardly of said sleeve, the slide member being longitudinally movable in a second direction opposite to that of the first direction to expose the other hook portion, wherein the other end of said chain is releasably mounted thereon, said slide member thereafter being movable in the first direction to conceal said other hook portion in said sleeve while simultaneously concealing the one hook portion therein, and means formed on said slide member and cooperating with said sleeve for frictionally locating said slide member in the locking position thereof.

3,988,814

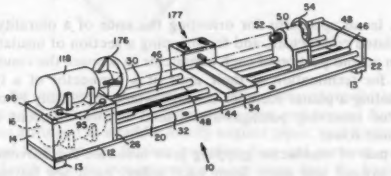
MILLING MACHINE

Robert E. Hoffman, 10290 Farallone Drive, Cupertino, Calif. 95014

Division of Ser. No. 343,507, March 21, 1973, Pat. No. 3,895,559. This application Apr. 3, 1975, Ser. No. 564,799

Int. Cl.² B27C *9/02*

U.S. Cl. 29—27 A 4 Claims



1. A versatile milling machine convertible to a lathe comprising, in combination:

a base structure;

support means including a first carriage coupled to a first lead screw supported by the base structure along a first axis, a horizontal guide rail substantially parallel with said first lead screw, and a tail stock supported by said guide rail about one terminal end and movable along said guide rail;

a first position drive means including a first variable speed, bidirectional motor engaged to said first lead screw for driving said first lead screw;

a cutting tool drive motor means engaged to a second carriage supported by the base structure and movable linearly within a second plane intersecting said first plane, the cutting tool drive means including a second variable speed motor;

a second position drive means coupled to said second carriage for controlling the linear position of said cutting tool drive means within said second plane;

a third position drive means engaged to said second carriage for controlling the linear position of said second carriage within a third plane intersecting said first and second planes;

release means for releasing said cutting tool drive means from said second carriage, sub-support means for receiving and supporting said released cutting tool drive motor about the other terminal end of said horizontal guide rail, a head stock member for engagement to said tool drive motor in line with said tail stock; whereby a work piece may be engaged intermediate the head stock and tail stock, and said first carriage means is adapted to support a lathe cutting tool at a position intermediate the ends of said guide rail and laterally from the axis of said head and tail stock; and

an electronic control network electrically engaged to said first and second motors and having power input terminal

means for receiving electrical power and controlling the electrical excitation to said first and second motors and to control the rate and direction of rotation of said first and second motors.

3,988,815

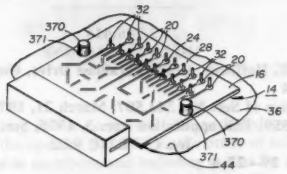
APPARATUS FOR TERMINATING A CABLE

Edwyn H. Petree, Burlington, N.C., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Sept. 29, 1975, Ser. No. 617,890

Int. Cl.² H05K *3/34*

U.S. Cl. 29—33 K **6 Claims**



1. In an apparatus for orienting the ends of a plurality of insulated conductors, and for stripping a section of insulation from an end portion of each conductor to prepare the conductors for termination at their ends of a connector of a type including a planar member through which a plurality of conductor receiving passageways extend in two adjacent and parallel rows:

a pair of conductor gripping jaws mounted for movement toward and away from each other, each jaw having a plurality of teeth defining conductor receiving channels therebetween, with the teeth on each jaw aligned with the conductor receiving channels on the other jaw for intermeshing entry therewithin upon movement of the jaws toward each other, the teeth and channels being dimensioned to define between the ends thereof, when the jaws are moved toward each other, a plurality of passageways having a spatial orientation corresponding to the spatial orientation of the connector passageways;

means for moving the conductor gripping jaws toward and away from each other;

conductor holding means, positioned adjacent the pair of jaws for releasably holding the conductors and for positioning the conductors, at a point spaced from the ends thereof, alternately before the teeth and the conductor receiving channels of one of the jaws when the jaws are moved away from each other, so that upon movement of the jaws toward each other the teeth of each jaw engage the conductors to force the conductors into the conductor receiving channels of the other jaw and to grip the conductors within the passageways defined between the ends of the teeth and the ends of the channels with the ends of the conductors extending essentially in parallel from the jaws in an orientation corresponding to the spatial orientation of the connector passageways;

means for moving the pair of conductor gripping jaws between a first location whereat the conductors are positioned between the jaws and gripped thereby, and a second location remote from the first to transfer the gripped conductors thereto;

a pair of conductor stripping jaws mounted for movement toward and away from each other and positioned, when moved away from each other, to receive the end portions of the gripped conductors therebetween when the conductor gripping jaws are at the second location, each conductor stripping jaw having a plurality of teeth defining conductor receiving channels therebetween with the teeth on each stripping jaw aligned with the conductor receiving channels on the other stripping jaw for intermeshing entry therewithin when the stripping jaws are moved together, the ends of the teeth and the ends of the channels having insulation cutting edges and the teeth and the channels being aligned and dimensioned to receive individual ones of the conductors within individual ones of the channels upon movement of the stripping jaws together and to sever the insulation surrounding each conductor, between the cutting edges at the ends of the teeth and the cutting edges at the ends of the channels, at a point between the conductor gripping jaws and the ends of the conductors, and to capture the conductors in the spatial orientation corresponding to the orientation of the connector passageways;

a conductor cutting blade, positioned adjacent the stripping jaws and mounted for movement through the conductors to sever the conductors along a plane perpendicular to the length of the conductors at a point between the stripping jaws and the ends of the conductors;

means for moving the stripping jaws toward each other after movement of the gripping jaws to the second location to sever the insulation surrounding each conductor and to capture the conductors in the orientation corresponding to the spatial orientation of the connector passageways, and to then move the cutting blade through the conductors to sever the conductors, and

means for moving the gripping jaws and the stripping jaws relative to and away from each other, after movement of the cutting blade to sever the conductors, to pull and strip the insulation from the ends of the conductors, whereby the ends of the conductors are stripped of insulation and oriented for termination within the conductor receiving passageways of the connector.

3,988,816

MAGNET ROLLER FOR ELECTROSTATIC RECORD DEVELOPING DEVICE

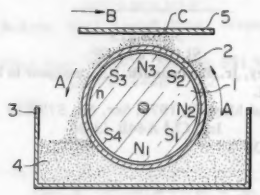
Takeo Tada, Tokyo, Japan, assignor to TDK Electronics Company, Limited, Tokyo, Japan

Filed Oct. 23, 1975, Ser. No. 625,079

Claims priority, application Japan, Oct. 23, 1974, 49-128298[U]

Int. Cl.³ B21B *31/02*

U.S. Cl. 29—116 R **8 Claims**



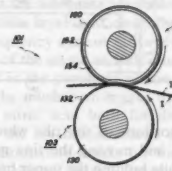
1. In a roller for use in the developing section of an electrostatic reproducing device, including a cylindrically shaped permanent magnet means on whose cylindrical surface are formed a plurality of magnetic poles, the main pole thereof being located in apposition to the image carrying surface of an electrostatic recording medium, and also including a rotating non-magnetic cylindrical sleeve surrounding said permanent magnet means, in which two adjacent magnetic poles of the same polarity are located among the plurality of magnetic poles formed on said permanent magnet means, the improvement comprising an auxiliary magnetic pole of opposite polarity from that of said two adjacent magnetic poles and located between said two adjacent magnetic poles, the magnetic field intensity of said auxiliary magnetic pole being less than the magnetic intensity of that one of said two adjacent magnetic poles preceding said auxiliary pole in the direction of rotation of said sleeve.

3,988,817

PRESSURE ROLL FOR DRY FUSER APPARATUS

Raghulinga R. Thettu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 18, 1973, Ser. No. 425,770
Disclosure was also published under the Trial Voluntary Protest Program on Jan. 28, 1975
Int. Cl. B21b *31/08*
U.S. Cl. 29—130 5 Claims



1. In a dry heated pressure fusing system for fusing toner images of an electrostatic copying machine in which a heated dry fuser roll having elastomeric coating and an elastomeric pressure roll define a contact arc to fuse toner images onto copy sheets, an improved pressure roll positioned to contact the dry heated fuser roll surface comprising

a core member made of silicone rubber,

said core member being covered with a rigid sleeve member, said sleeve member being coated with a thin layer of elastomeric material of the same or lower durometer as said core member,

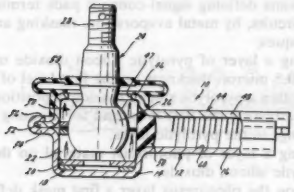
wherein said rigid sleeve has a thickness ranging from about 2 to about 4 mils.

3,988,818

TIE ROD END

William D. Allison, Grosse Pointe Farms, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed July 7, 1975, Ser. No. 593,810
Int. Cl.² B21D *53/10*
U.S. Cl. 29—149.5 B 4 Claims



1. A method of making a preloaded ball and socket joint comprising a housing having a socket portion, a ball stud having a ball situated in said socket portion and a frangible bearing means engaging said ball;

said method comprising the steps of:

positioning a closure member in engagement with said frangible bearing means and exerting a force on said frangible bearing means causing it to fracture into a plurality of bearing elements;

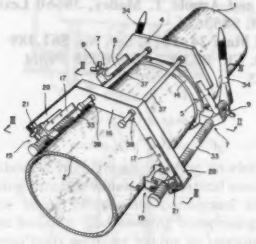
securing said closure member to said housing.

3,988,819

APPARATUS FOR INSERTING SMALL-DIAMETER PIPE INTO LARGE-DIAMETER PIPE AND/OR PULLING THE FORMER OUT OF THE LATTER

Toshiyuki Sato, Takatsuki, Japan, assignor to Kabushiki Kaisha Suiken, Osaka, Japan

Filed Sept. 5, 1974, Ser. No. 503,436
Claims priority, application Japan, Sept. 7, 1973, 48-105446
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976
Int. Cl.² B23P *19/04*
U.S. Cl. 29—237 11 Claims



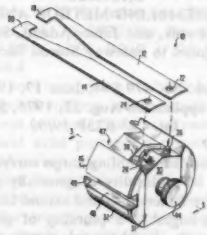
1. An apparatus for advancing pipes telescopically into and/or out of engagement comprising first and second frame means arranged to straddle axially aligned pipes, said first and second frame means further including free end portions provided with slidable means serving to accommodate the frames of said apparatus to pipes of varying diameters, lockable jaw means associated with each of said slidable means arranged to be brought into contact with the respective pipes, parallel longitudinally disposed bar means associated with and extending through said lockable jaw means and actuator means carried by each of said bar means for advancing and retracting said telescopic pipes into and out of contact and vice versa.

3,988,820

TOOL FOR THE REMOVAL OF AUTOMOTIVE IGNITION LOCK ASSEMBLIES

Carl H. Goad, and William F. Hall, both of Albuquerque, N. Mex., assignors to Charles J. Granone, Albuquerque, N. Mex.

Filed Aug. 14, 1975, Ser. No. 604,675
Int. Cl.² B23P *19/04*
U.S. Cl. 29—244 1 Claim



1. A device for removing a cylindrical lock bolt from a steering column of a type having an elongated chamber therein for receiving said lock bolt, said bolt having a spring-biased detent extending radially therefrom, a circumferentially located recess formed in said chamber receiving said detent when said lock bolt is fully inserted and said detent

having a camming surface on the inner side thereof and a locking surface on the other side thereof comprising,

two elongated shim means extending the length of said bolt,

a pair of inwardly directed flanges which engage said cam surface of said detent,

a means for applying tension to said shim means and causing said flanges to engage said cam surface and depress said detent to enable the withdrawal of said lock bolt from said chamber.

3,988,821

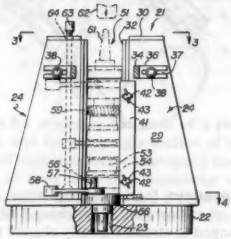
ASSEMBLY STAND FOR ASSEMBLING CRANK SHAFTS

George D. Daniels, 142 Wilson Way, Pioneer Park, Milpitas, Calif. 95035, and Arnold T. Malley, 38660 Lexington St., Fremont, Calif. 94536

Filed Mar. 24, 1975, Ser. No. 561,489

Int. Cl.² B23Q 71/04; B23P 19/04

U.S. Cl. 29—283 **6 Claims**



1. An assembly stand for assembling multiple crank shaft elements for use on a press comprising a first base shaped to fit on a conventional press bed, said first base formed with a central aperture, at least three column elements each movable radially inward and outward of said central aperture, each said column element having a second base slidable along said first base, cooperating means to secure said second base fixed to said first base in a desired position of adjustment, and a vertically elongated front facing said central aperture, said front having an inward projecting, vertically elongated front alignment guide, said front alignment guide comprising a narrow, thin strip extending vertically from top to bottom on the inward facing surface of said front, said strips being located closest to said central aperture of all portions of said column elements, the space between said column elements being unobstructed at the top for application of force by the ram of said press.

3,988,822

PALLET DISASSEMBLING METHOD AND APPARATUS

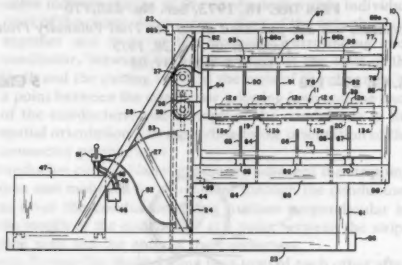
Albert Lopez, Norwalk, and James Adams, San Gabriel, both of Calif., assignors to Safeway Stores, Incorporated, Oakland, Calif.

Division of Ser. No. 479,894, June 17, 1974, Pat. No. 3,916,498. This application Aug. 25, 1975, Ser. No. 607,292

Int. Cl.² B23P 19/02

U.S. Cl. 29—427 **1 Claim**

1. A method for disassembling cargo carrying pallets which are constructed of a plurality of generally parallel, spaced-apart slats that are fastened to and extend laterally across the top and bottom edges of a plurality of generally parallel, spaced-apart ribs, the method employing horizontally extending tine means which are positioned between a plurality of upper breaker mmebers and a plurality of lower breaker members, the method including the steps of inserting a pallet onto the tine means with the latter being disposed generally parallel with the ribs and between the top and bottom slats, with the lower breaker members positioned in register with portions of the ribs which are exposed between the slats, moving the tine means downwardly against the slats while holding the lower breaker members stationary to cause the bottom slats to be separated from the ribs, positioning the upper breaker members in register with portions of the ribs which are exposed between the top slats, and moving the tine means upwardly against the top slats while holding the upper breaker members stationary to cause the top slats to be separated from the ribs.



3,988,823

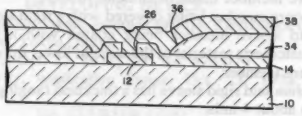
METHOD FOR FABRICATION OF MULTILAYER INTERCONNECTED MICROELECTRONIC DEVICES HAVING SMALL VIAS THEREIN

Kuo-Chen Hu, Mission Viejo, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Aug. 26, 1974, Ser. No. 500,793

Int. Cl.² H01L 21/88

U.S. Cl. 29—577 **11 Claims**



1. A method for fabricating a multilevel interconnected large scale integrated microelectronic circuit including vias therein having 0.5 mil and smaller openings for interlayer electrical communication of active devices and unit circuits on a silicon wafer in the microelectronic circuit, comprising the steps of:

preparing a silicon wafer with active devices therein and interconnecting the active devices into functional unit circuits at a first level of aluminum metallization including means defining signal-connect pads terminating the unit circuits, by metal evaporation, masking and etching techniques;

depositing a layer of pyrolytic silicon dioxide of approximate 0.5 micron thickness on the first level of metallization within a pyrolytic silicon dioxide deposition chamber for passivating the first level and for creating undesired openings in the pyrolytic layer;

depositing a layer of photoresist material on the layer of pyrolytic silicon dioxide;

placing on the photoresist layer a first mask defining positions of via openings to be etched in the layer of pyrolytic silicon dioxide and to be positioned over the signal-connect means;

exposing the photoresist layer through the mask and thereafter removing the mask;

developing, baking and further processing the exposed photoresist layer for forming therefrom an etch-resistant mask on the pyrolytic silicon dioxide layer with means defining openings in the etch-resistant mask positioned above the positions of the vias to be formed in the pyrolytic silicon dioxide layer;

etching the pyrolytic silicon dioxide layer through the opening means in the etch-resistant mask by applying a mixture of acetic acid, ammonium fluoride and hydrogen fluoride over the etch-resistant mask for forming the vias having at most 0.5 mil openings;

stripping the etch-resistant mask from and thereafter cleaning the etched pyrolytic silicon dioxide layer;

forming aluminum-magnesium masks defining mushroom configurations, each comprising an aluminum crown and a magnesium stem on the etched pyrolytic silicon dioxide layer, with the stems covering the vias in the etched pyrolytic silicon dioxide layer;

sputter depositing a layer of silicon dioxide of a thickness sufficient for adequate insulation over the pyrolytic silicon dioxide layer and over the mushroom-masks in a radio-frequency system for providing tapered deposits at the base of the stems and for closing any of the undesired openings in the pyrolytic silicon dioxide layer;

removing the mushroom-masks by immersing the wafer in a dilute nitric acid bath for dissolving the magnesium stems of the mushroom-masks and thereby for floating-out the mushroom-masks for forming means in the RF-sputtered silicon dioxide layer defining openings of at least 3 mil diameters over the vias having at most the 0.5 mil openings in the pyrolytic silicon dioxide layer;

forming a second level of aluminum metallization defining interconnections among the active devices and the unit circuits over the RF-sputtered silicon dioxide layer and the pyrolytic silicon dioxide layer exposed and surrounded by the opening means for making low resistance electrical contact through the vias and for effecting continuity of the second level of aluminum through the opening means and the vias;

further processing of the silicon wafer from the second level of metallization into the integrated microelectronic circuit; and

annealing of the circuit at approximately 400° C for approximately 16 hours for reducing any contact resistance through the opening means and the vias to a uniform, acceptable level.

3,988,824

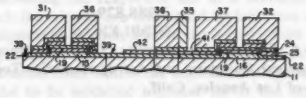
METHOD FOR MANUFACTURING THIN FILM CIRCUITS

George E. Bodway, Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 255,905, May 22, 1972, abandoned, which is a continuation of Ser. No. 56,610, July 20, 1970, abandoned. This application Sept. 17, 1973, Ser. No. 397,524

Int. Cl.² B01J *17/00*

U.S. Cl. 29—577 **13 Claims**



1. A method for manufacturing a structure from which thin film capacitors and resistors and interconnections therefor may be formed, said method comprising the steps of forming a plurality of metallic film elements on an upper surface of a substrate, forming an oxidized upper surface on each of the metallic film elements, forming a dielectric layer of the upper surface of the substrate and the oxidized upper surface of each of the metalic film elements, forming a layer of resistive material over the dielectric layer, and forming a layer of conductive material over the layer of resistive material.

3,988,825

METHOD OF HERMETICALLY SEALING AN ELECTRICAL COMPONENT IN A METALLIC HOUSING

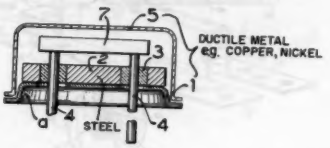
Dieter Fuchs, and Leopold Laber, both of Landshut, Germany, assignors to Jenaer Glaswerk Schott & Gen., Mainz, Germany

Filed Nov. 24, 1972, Ser. No. 309,375

Claims priority, application Germany, Nov. 24, 1971, 2158188

Int. Cl.² H05K *5/06;* **H01L** *21/52, 23/10;* **H01H** *45/02*

U.S. Cl. 29—622 **2 Claims**



1. Method of hermetically sealing an electrical component in a housing through which an electrical conductor passes, the conductor being electrically connected to the component within the housing, said housing comprising:

a. a metal body member having an opening therein through which the conductor passes,

b. a glass body disposed in said opening in sealing relation with the metal body and the conductor, said metal body and glass body forming a compressive glass lead through or a reinforced compressive glass lead through for the conductor,

c. a metal support plate for the metal body having an opening through which the conductor passes and comprising a body portion and a flange disposed outwards of the body portion, the opening in the metal body member being radially inward of the opening in the metal support plate,

d. a metal cap extending over the metal body member and metal support plate encapsulating the metal body member and electrical component and having a flange joined to the flange of the metal support plate in hermetically sealed relation,

the method comprising bonding the metal body member to the metal support plate by soldering or brazing and effecting said joining of the flanges of the metal cap and metal support plate by cold pressure welding. and simultaneously with said bonding of the metal body to the metal support plate, forming said glass body in sealing relation as aforesaid.

3,988,826

TUBE SLITTER TOOL

Arvid E. Heikkala, 2523 N. Linden Ave., Waukegan, Ill. 60085

Filed Feb. 26, 1976, Ser. No. 661,656

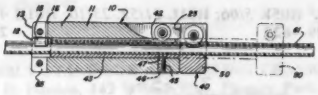
Int. Cl.² B21F *13/00;* **B23D** *21/06;* **B26B** *27/00*

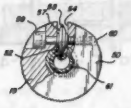
U.S. Cl. 30—90.4 **3 Claims**

1. A tube slit tool comprising a tubular body section having an axial passage of uniform inner diameter, a cutting blade mounted adjacent one end of said axial passage and extending radially into said axial passage, a non-cutting guide roller having a tapered narrow edge portion which is freely rotatably mounted adjacent the opposite end of said axial passage, said edge portion of said guide roller extending radially into said axial passage for engaging and deforming the surface of a tube, which is passed longitudinally through said passage, about said edge such that a tube is slit longitudinally without allowing the tube to rotate relative to the longitudinal axis cylindrical body section while the tube is passed longitudinally through said tool.

2. A tube slitting tool as in claim 1, wherein said axial passage has a tubular guide sleeve member removably seated therein with the innermost end of said guide sleeve section

being spaced from said cutting blade, said guide sleeve section having a groove extending longitudinally thereof which is adapted to receive therein the said edge portion of the said guide roller, which extends into said passage, said guide sleeve section having an enlarged end section integral therewith provided with a longitudinal passage having the same inner diameter as that of the guide sleeve section, and a second guide roiler mounted adjacent the outer end of said enlarged





end section with the peripheral portion thereof extending into the said longitudinal passage; whereby a tube having a diameter smaller than the first mentioned tube can be slit while said guide sleeve member is seated in said axial passage.

3. A tube slitting tool as in claim 1, wherein a second cutting blade is mounted in said body section adjacent said one end and spaced circumferentially from the first mentioned cutting blade.

3,988,827

SMALL-SIZE CUTTER

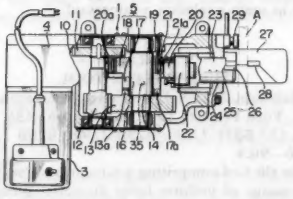
Kaneaki Sakamoto, Chigasaki, and Ichiro Tokunaga, Yokohama, both of Japan, assignors to Kabushiki Kaisha Ogura Chuck Seisakusho, Japan

Filed June 16, 1975, Ser. No. 587,219

Claims priority, application Japan, June 21, 1974, 49-72894[U]

Int. Cl.² B26B *15/00*; B23D *27/04*

U.S. Cl. 30—92 **1 Claim**



1. A portable, small size cutter for cutting steel rods or wires comprising a body frame, an electric motor disposed in said body frame, a reduction gear mechanism driven by said electric motor, an axial shaft journaled at its opposed ends in said body frame and having an eccentric circular cam means rotated thereon by said gear mechanism, a needle bearing disposed around the whole periphery of said eccentric circular cam means, a rod having a section formed at one end to enclose the whole circumference of said cam means by the intermediary of said needle bearing, a horizontally reciprocal slide arm having at an inner end a shaft coupling it with another end of said rod and extending outwardly through said body frame, a first blade mounted on an outer end of said slide arm, and a material rod receiving member protruding outwardly through said body frame having a stationary blade mounted in a position opposed to said first blade whereby material may be cut apart between said stationary blade and the first blade capable of moving toward and away from said stationary blade, said eccentric circular cam means being movable on said axis shaft in the thrust direction into and out of meshing engagement with said reduction gear mechanism, and being provided with means for controlling said thrust movement whereby the cutting operation is selected between a mode in which the reciprocation of said movable blade is discontinued after said eccentric means has made a 360° rotation without disenergizing said electric motor and another mode in which said eccentric means continues a plurality of 360° rotations thereby to repeat the reciprocation of said movable blade.

3,988,828

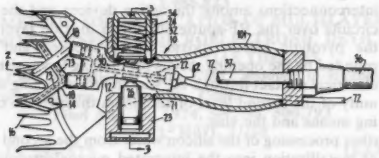
ANIMAL SHEARING APPARATUS

William R. C. Geary, 4/18 Kensington Road, South Yarra, Victoria, Australia (3141)

Filed Feb. 11, 1975, Ser. No. 549,053

Int. Cl.² B26B *19/24, 19/34*

U.S. Cl. 30—210 **6 Claims**



1. A shearing handpiece comprising a body, a transversely oscillatable cutter operating arm pivotally connected to the body forwardly of a handgrip therefor, thereby to oscillate a toothed cutter across the face of a comb fixed to the body, a hydraulic motor on the body for actuating the cutter operating arm, said motor comprising a cylinder arranged transversely on the body at one side of the cutter operating arm and forwardly of its pivotal axis, a coacting relatively slidable plunger in the cylinder, the cylinder being in contact communication with a source of hydraulic fluid under pressure when the motor is operating, means for connecting cylinder to a flexible tube to a remote power generator operable to impart successive pressure pulses to the hydraulic fluid so that the plunger is movable inwardly by said successive pressure pulses, and said arm is moved towards the opposite side of the body, and means on the body at said opposite side of the arm for moving the latter in the reverse direction in the intervals between said successive pressure pulses.

3,988,829

NIBBLER

Kunio A. Sumida, Los Angeles, Calif., assignor to Primex Equipment Company and Astropneumatics Tool Company, both of Los Angeles, Calif.

Filed Jan. 30, 1975, Ser. No. 545,421

Int. Cl.² B26B *15/00*

U.S. Cl. 30—241 **13 Claims**

1. In a hand tool,

a housing including

drive means therein,

first plate means fixedly attached to said housing and having means thereon forming a planar bearing surface of greater width than a punch means to be employed therewith and extending toward a work cutting location,

second plate means operatively connected to said drive means and operatively mounted for sliding surface-to-surface reciprocation relative to said first plate means,

punch means mounted on said second plate means for movement therewith and extending therefrom into surface-to-surface contact with said bearing surface for reciprocation relative thereto,

block means releasably fixed relative to said bearing surface having

an open slot extending across one surface thereof, said open slot being located adjacent said bearing surface for defining a support and path of reciprocation for said punch means, and

means for laterally adjusting at least one of said punch and said block means relative to said bearing surface.

3,988,830

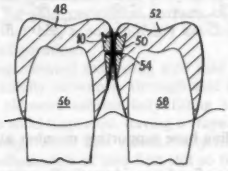
PROXIMAL SOLDERING TABS FOR A DENTAL PROSTHETIC STRUCTURE

Olle Hulten, Rorsmansgatan 50, 216 11 Malmo, Sweden

Filed Apr. 23, 1975, Ser. No. 570,818

Int. Cl.² A61C *5/08*

U.S. Cl. 32—12 **9 Claims**



1. Soldering tabs for investment molded crowns fabricated from non-precious metals and disposed on at least two adjacent teeth, comprising each of said tabs being fabricated from metal means capable of being soldered, said metal means comprising a precious metal, each tab including securing means for anchoring the respective tab in a non-solderable metal of which the crowns are fabricated, at least one of said tabs being disposable in each crown at an outer wall of the crown facing another of said tabs disposed in an adjacent crown at a proximal outer wall of the adjacent crown to permit the facing tabs to be soldered together to fix the adjacent crowns relative to each other.

3,988,831

BUCCAL END TUBE

Melvin Wallshein, 8645 Bay Parkway, Brooklyn, N.Y. 11214

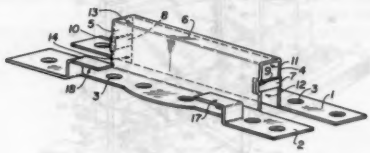
Filed May 5, 1975, Ser. No. 574,569

The portion of the term of this patent subsequent to Apr. 1, 1992, has been disclaimed.

Int. Cl.² A61C *7/00*

U.S. Cl. 32—14 A **32 Claims**

1. A buccal end tube device for selectively orienting an orthodontic arch wire relative to a tooth, the buccal end tube device being adapted for mounting to a buccal surface of the tooth, the device comprising: at least two arch wire positioning means which are spaced apart from each other in the axial direction of the buccal end tube device, one of said arch wire positioning means defining at least one aperture and the other of said arch wire positioning means defining at least two apertures which are spaced apart from each other in the buccal-lingual direction to define inner and outer apertures relative



to the buccal surface of a tooth to which said buccal end tube device is mounted, said apertures being adapted to receive spaced portions of the arch wire, whereby the arch wire may be disposed in various predetermined angular orientations within a buccal-lingual plane by positioning the arch wire in selected apertures of said at least two spaced apart arch wire positioning means and maintained in the selected orientation against the action of external forces applied both to the arch wire and to the buccal end tube device.

3,988,832

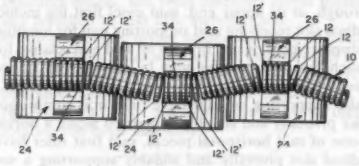
ORTHODONTIC ARCH WIRE

Melvin Wallshein, 8645 Bay Parkway, Brooklyn, N.Y. 11214

Continuation-in-part of Ser. No. 300,444, Oct. 10, 1972, Pat. No. 3,861,042, and a continuation-in-part of Ser. No. 476,479, June 5, 1974, Pat. No. 3,878,609. This application Dec. 23, 1974, Ser. No. 535,687

Int. Cl.² A61C *7/00*

U.S. Cl. 32—14 A **26 Claims**



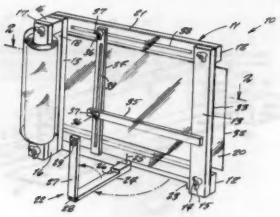
1. An orthodontic arch wire adapted to be connected to an orthodontic bracket mounted on a malloccluded tooth, the arch wire comprising a single coiled strand in the form of a tightly wound helix normally having an array of successively abutting and substantially parallel substantially circular turns, said strand having a substantially cylindrical lumen extending therethrough, said strand when formed into said turns having a predetermined radial thickness, said turns having a common internal dimension of said lumen greater than twice said predetermined radial thickness of said strand but no more than three times said predetermined radial thickness of said strand, and having a common outer dimension no greater than approximately 0.025 inches, said helix being made from a wire material sufficiently elastic to permit bending of the arch wire over a short length thereof by selectively and at least partially separating adjacent turns, to permit stretching thereof to separate adjacent turns, and to provide sufficient stiffness over a long length to provide adequate anchoring characteristics for orthodontic devices attached thereto.

3,988,833

TRACING SCOPE

Robert Sparks, and George Spector, both of 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007

Filed Nov. 19, 1974, Ser. No. 525,057
Int. Cl.² B43L *13/16*
U.S. Cl. 33—20 C **1 Claim**



1. In a tracing scope, the combination of a wooden frame consisting of parallel lower and upper horizontal pieces and parallel vertical pieces, with the ends of said vertical pieces overlapping ends of said horizontal pieces, said vertical and horizontal pieces being detachably connected by bolts and wing nuts at said overlap, thus forming a rectangular window closed by a stiff transparent plastic backing sheet retained between said horizontal and vertical piece overlap, a pair of spacers mounted on one of said vertical pieces at one end of said frame, said spacers supporting a vertical bar spaced from said frame, said bar supporting a roll of flexible transparent tracing material relatively thin compared to said backing sheet and extendable adjacent a front side of said stiff plastic sheet, so an artist may draw thereupon, a notch along a lower edge of the lower of said horizontal pieces normally storing an easel, said easel comprised of a first leg pivotable for movement in a horizontal plane about a vertical nail supported in said lower horizontal piece at its center, one end of said first leg pivotally supporting a second leg by means of a hinge, said second leg being upwardly pivotable into a vertical plane relative to said first leg and having an eye observation opening therethrough, at its upper end, said easel first leg includes a longitudinal slot receiving said supporting nail for longitudinal sliding displacement of said first leg on said nail relative to said frame such that said opening may be moved with respect to said sheet while said second leg is in its vertical position, said frame also supporting an adjustable ruler unit comprised of a first ruler pivotally and slidably supported along a horizontal slot of one of said horizontal pieces, said first ruler having a longitudinal slot pivotally and slidably supporting a second ruler.

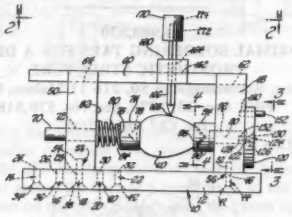
3,988,834

EGG MARKER

Robert J. Anderson, 8315 Dixboro Road, South Lyon, Mich. 48178

Filed Feb. 1, 1974, Ser. No. 438,779
Int. Cl.² B43L *13/00*
U.S. Cl. 33—21 R **1 Claim**

1. In egg marking apparatus the improvements comprising:
a horizontally extending base supporting member;
a first upstanding vertically extending support member;
a second upstanding vertically extending support member;
said first and second vertically extending support members fixed to said horizontal base supporting member;
a first shaft member operable to rotate within a corresponding aperture in said first vertically extending support member;
a second shaft member co-axial with said first shaft member and operable to pass through an aperture in said second upstanding vertically extending support member;
a first knob member fixed to said first shaft member and having a recessed portion operable to engage the end surface of an egg;
rubber strips fixed to said first knob member and operable to frictionally engage an end of said egg;
a second knob member fixed to said second shaft member having a recessed portion operable to extend to the other surface of the egg;
a helically wound coil spring resisting compression and urging force against the right hand side of said second upstanding vertically extending support member and the left hand side of said second knob member and wherein the diameter of the coils in said spring member is greater than the diameter of said second shaft member to exhibit a substantially helical shape and wherein a portion of said coils engages said second knob member and another portion of said coils engages said second upstanding vertically extending support member;
a plurality of apertures in said horizontally extending base supporting member near said second upstanding vertically extending support member;
a threadably engaging aperture in said second upstanding vertically extending support member;
a threaded bolt member capable of extending through any of said plurality of aperture and into said threadably engaging aperture thereby securing said second upstanding vertically extending support member to said horizontally extending base supporting member at a plurality of positions;



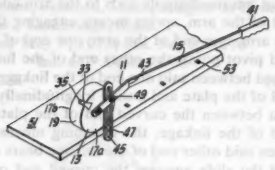
a guide member fixed to said vertically upstanding support members and spaced at a distance above and laterally displaced from the central axis of said shaft member;
a slide member mounted on said guide member by a slot portion laterally displaced from the center of said slide member, and operable to allow said slide member to slide on said guide member;
an aperture extending vertically through said slide member proximate the center thereof;
a marker member extending through said aperture in said slide member and operable to engage an egg held between said first and second knob members;
a disc member fixed to said first shaft member;
apertures in said disc member corresponding to preselected ordinal fractions of full rotation of said first shaft member;
a córresponding aperture co-axial with one of said apertures in said disc member, said corresponding aperture communicating with any one of said apertures in said disc at a predetermined location and said corresponding aperture being in said first upstanding vertically extending support member;
a pin member operable to mutually engage one of said apertures in said disc member and said corresponding aperture in said first upstanding vertically extending support member.

3,988,835

MARKING DEVICE

William Franklin Thornton, 351 Hudson Ave., McDonald, Pa. 15057

Continuation-in-part of Ser. No. 374,692, June 28, 1973. This application Dec. 16, 1974, Ser. No. 532,902
Int. Cl.[2] B25H 7/00
U.S. Cl. 33—36 8 Claims



1. A marking device comprising:

a. a cylindrical housing having an outer peripheral surface having a predetermined circumference and two substantially spaced apart parallel faces;

b. at least one recess being formed in said peripheral surface that extends radially inwardly of said cylindrical housing; said recess beginning from said one face of said cylindrical housing and terminating at about one-fourth inch of the other face of said cylindrical housing; said recess forming a first slot on the said one face of said cylindrical housing that has a substantially trapezoidal cross section configuration with a broader base thereof facing radially inwardly of such cylindrical housing and forming a second slot on said peripheral surface of said cylindrical housing that has a substantially rectangular cross-sectional configuration;

c. a marking element extending into said recess and protruding radially outwardly through said second slot; said marking element substantially filling said recess and forming a solid trapezoid, having a trapezoidal cross-sectional configuration that substantially fills the cross sectional configuration of said first slot so that said marking element may be moved axially but not radially from said cylindrical housing; said marking element being composed of a firm, absorbent material;

d. an ink supply source within said housing cooperating with said marking element for supplying ink to said marking element; said ink supply source being composed of an absorbent material;

e. an extended arm being journalled to said cylindrical housing; said extended arm comprising a first portion that is journalled to said cylindrical housing and that is spaced apart from and substantially parallel to said cylindrical housing and its line of travel, and a second portion that is inclined to said first portion and extending away from said cylindrical housing and its line of travel;

f. a movable guide being removably secured to said first portion of said arm and being capable of radial extensions beyond the peripheral surface of said cylindrical housing so that said device may be guided along the edge of a workpiece and being capable of radial retraction from extension beyond the said peripheral surface of said cylindrical housing so that said device may be used on a planar surface without interference; and,

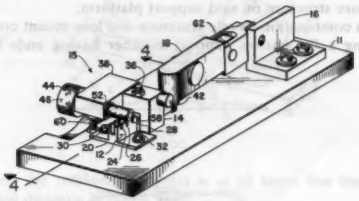
g. an attachment brush being fixed to said first portion of said extended arm adjacent to said peripheral surface and in contact therewith so that said brush cleans the peripheral surface and said marking element of debris.

3,988,836

APPARATUS FOR MEASURING THE CONCENTRICITY OF ROTORS OF MINIATURE MOTORS WITH RESPECT TO THEIR AXIAL PIVOTS

Harry H. da Costa, and Paul L. Krichbaum, both of Scottsdale, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed May 29, 1975, Ser. No. 581,992
Int. Cl.[2] G01B 5/25
U.S. Cl. 33—174 Q 5 Claims



1. An apparatus for measuring the concentricity of the periphery of a disk magnet rotor assembly for a miniature motor with respect to its axle pivots, including in combination:

a base surface;

means for rotatably retaining the axle of the rotor assembly, said retaining means being mounted on said base surface;

means for measuring the concentricity of the rotor assembly, said measuring means being in physical contact with the rotor assembly and being responsive to eccentricities in the rotor assembly periphery when said rotor assembly is rotated such that an output signal is derived which corresponds to the concentricity of said rotor assembly to said axle pivots thereof;

means for rotating the rotor assembly including a base member disposed on said base surface having a slot located centrally thereof through which said measuring means is disposed, an axle member disposed through said base member in generally parallel relationship to the axle of the rotor assembly when the axle is supported in the retaining means, and rotor assembly driver means pivotally attached to said axle member; and

said rotor assembly driver means including drive shaft assembly means rotatably disposed therethrough in spaced parallel relationship to said axle member, said drive shaft assembly means being in frictional contact with the periphery of the rotor assembly during testing thereof for rotating the rotor assembly.

3,988,837

OPTICAL PLUMBING DEVICE

George E. Benson, 7013 Brookcrest Way, Citrus Heights, Calif. 95610

Filed Mar. 21, 1975, Ser. No. 560,609
Int. Cl.[2] G01C 15/00
U.S. Cl. 33—227 3 Claims

1. A portable optical plumbing device, placeable on an external supporting surface for directing a pencil beam of light to an external surface vertically and spacially displaced from the supporting surface comprising:

a. a substantially flat support platform;

b. an enclosure structure defining an enclosure with a top opening cover having a light constricting aperture, said enclosure structure being mounted substantially centrally on said support platform;

c. at least one spirit level mounted on said support platform outside said enclosure structure;

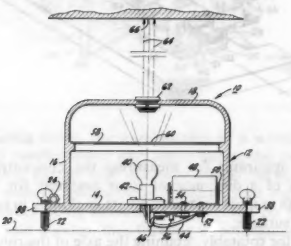
d. indicia means on said support platform for locating said support platform relative to a point on the supporting surface;

e. adjustable support means connected to said support platform outside said enclosure structure, for adjusting the level of said support platform with the external supporting surface;

f. a self contained power source mounted within said enclosure structure on said support platform;

g. a light source mounted within said enclosure structure below said light-constricting aperture electrically connected to said power source, said light source emitting dispersed light generally directed out said top opening light constricting aperture in said top cover of said enclosure structure on said support platform;

h. a combination handle structure and lens mount comprising a flat narrow support member having ends fixedly



connected to said enclosure structure and a central portion arched over said top cover, said support member having a lens mounting aperture in said central portion positioned directly over and spatially displaced from said light constricting aperture in said top cover;

i. a focusing lens mounted in said lens mounting aperture, said lens having focusing properties for focusing dispersed light directed at said lens through said light constricting aperture from said light said light constricting aperature having a perimeter larger than that of said lens source into a pencil beam of light, whereby said pencil beam of light and a substantial portion of said dispersed light are projected from said optical plumbing device to an external surface parallel to said support platform.

3,988,838

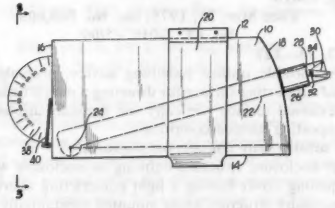
ARTISTS DEVICE

Robert C. Phillips, Southbury, Conn., assignor to The Raymond Lee Organization, Inc., a part interest

Filed Sept. 15, 1975, Ser. No. 613,115

Int. Cl.² G01C *3/00*

U.S. Cl. 33—274 **1 Claim**



1. A device comprising:

a flat transparent elongated plate having two parallel sides of unequal length, one straight end interconnecting the sides and being perpendicular thereto, the opposite end being curved and interconnecting the two sides while being perpendicular to neither side;

an elongated flat transparent arm lying in a plane parallel to the plate and adjacent one major surface of the plate, one end of the arm being pivotally secured to the plate adjacent the straight end and longer side, the other end of the arm extending past the curved end of the plate, the curved end of the plate defining an arc of a circle centered on the pivot point of said arm;

clamping means on the other end of the arm manually operable to clamp the arm to the curved edge of the plate in any desired position thereacross, said clamping means including a small elongated linkage pivotally secured at a point intermediate its ends to the arm adjacent the other end of the arm, spring means engaging the other end of the arm, one end of the arm, one end of the linkage and said pivot point, the other end of the linkage being disposed between said one end of the linkage and the curved end of the plate and a slide longitudinally slidable on the arm between the curved end of the plate and the other end of the linkage, the clamping means being engaged when said other end of the linkage bears against the slide and the slide engages the curved end of the plate, the clamping means being disengaged when said slide is spaced from the curved end of the plate;

a semicircular member of like thickness as said plate, said member and plate being coplanar and integral, the straight side of the member being coincident with the straight end of the plate;

a pointer extending along one of the major surfaces of the plate with one end of the pointer alignable with any point along the curved periphery of the member, the other end of the pointer being pivotally secured to said straight end of the plate, said pointer defining a radius of the circle defined by the semicircular member; and

another and transparent slide adjacent the opposite major surface of the plate and supported on the sides of the plate, said another stride being manually slidable back and forth longitudinally on the plate.

3,988,839

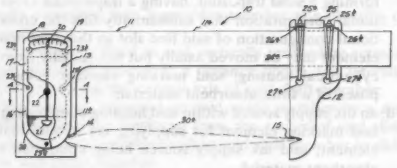
MODEL AIRCRAFT INCIDENCE GAUGE

Allen J. Coomber, 1401 Central Ave., Billings, Mont. 59102

Filed July 3, 1975, Ser. No. 592,914

Int. Cl.² G01C *9/12;* **G01M** *9/00*

U.S. Cl. 33—371 **2 Claims**



1. A model aircraft gauge for measuring angle of attack or incidence, wash-out or wash-in and angle of engine thrust comprising:

a. a substantially L-shaped member having a longer arm and a shorter arm with a first edge, straight over a substantial part of its length so as to be engageable with a model element transverse to the axis of said engine thrust;

b. a reference block freely, slidably mounted on the longer arm of said L-shaped member and disposed in substantially parallel relationship to the shorter arm of said L-shaped member, the mounting of said reference block on the longer arm being such that it may be completely slid off said longer arm so as to permit the measurement of engine thrust;

c. airfoil engaging means on the shorter arm of said L-shaped member and on said reference block for making light frictional contact with the two edges of a model aircraft airfoil, said airfoil engaging means comprising a

pair of oppositely facing notches disposed respectively in said shorter arm and the facing edge of said reference block, said notches being dimensioned so as to accommodate a wide range of airfoil chord sizes; and

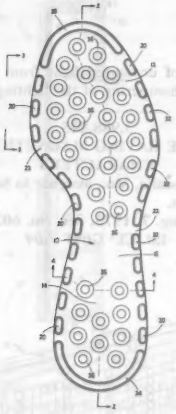
d. a gravity actuated pointer and a dial affixed to said L-shaped member such that the pointer axis and said first edge of the shorter arm are subtantially parallel when the pointer indicates a zero angle.

3,988,840

SOLE CONSTRUCTION

Robert P. Minihane, Concord, Mass., assignor to Hyde Athletic Industries, Inc., Cambridge, Mass.

Filed May 7, 1975, Ser. No. 575,576
Int. Cl.² A43B *13/06*
U.S. Cl. 36—32 R **12 Claims**



1. A sole for shoes comprising a base, a first plurality of cleats extending from the base and disposed in two groups with the cleats of each group being disposed in relatively uniformly spaced relationship, said groups being disposed in the sole area and heel area, respectively, said groups of cleats being separated by an area between the groups that is absent first plurality cleats, and a second plurality of elongated cleats spacedly and peripherally disposed about the entire edge of the sole base including about the sole and heel areas and including a majority of substantially straight cleats and opposite end cleats that are arcuate and longer than the other elongated cleats.

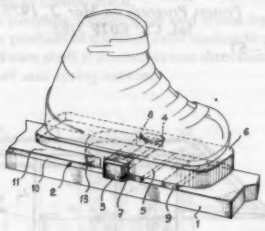
3,988,841

SKI-BOOT

Georges Pierre Joseph Salomon, Annecy, France, assignor to S.A. Etablissements Francois Salomon & Fils, Annecy, France

Filed Aug. 25, 1975, Ser. No. 607,615
Claims priority, application France, Aug. 30, 1974, 74.29616
Int. Cl.² A43B *5/04*
U.S. Cl. 36—117 **8 Claims**

1. A ski-boot designed to be attached to a ski-boot safety binding comprising at least two safety-release retaining elements for said boot located on each side of the ski and extending, at least partly, above the plane of the ski upon which the sole of the boot rests; said boot being characterized in that the sole of the boot comprises a recess allowing one of the retaining elements to pass when the boot moves and bears against the other retaining element; the profile of the surface defining the recess located under the heel of the boot being defined geometrically by the fact that, for positions occupied by the boot while it is being released, the maximal width of the sole



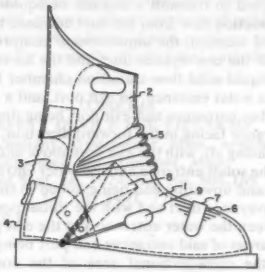
between the retaining elements is at all times less than the maximal distance between them.

3,988,842

MOLDED HINGED AND CORRUCATED SKI BOOT

Richard K. Rathmell, 12 Pine Tree Road, Ramsey, N.J. 07446

Filed June 19, 1975, Ser. No. 588,204
Int. Cl.² A43B *5/04*
U.S. Cl. 36—121 **10 Claims**



1. A molded ski boot having substantial stiffness in the latteral direction and independent flexibility in the forward-backward direction, said boot having elements that include:

a. a foot-covering section,

b. a leg-holding section,

c. a sole, and

d. elastomeric hinges integrally molded with and connecting the leg-holding section to the foot-covering section, said hinges being on each side of the boot and having a common horizontal axis that is approximately parallel to the axis of the skier's ankle joint which allows forward-backward motion of the skier's leg relative to his foot, said hinges being identifiable by their geometry wherein each hinge has a relatively great thickness as measured in the line of the axis, said thickness being at least two times the average thickness of other sections of the ski boot excluding the sole, and each hinge has a surface projecting forward of the axis and a surface projecting backward from the axis, and the average horizontal distance between these surfaces and through the axis is not more than three times the thickness of each hinge as measured along the axis.

3,988,843

MINING TRANSITION CHAMBER

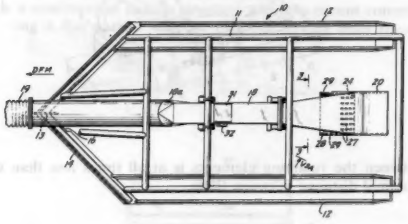
Frank Howard Brockett, III, Bellevue, Wash., assignor to The International Nickel Company, Inc., New York, N.Y.

Filed Dec. 11, 1974, Ser. No. 531,753

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² E02F *3/92*

U.S. Cl. 37—57 **10 Claims**



1. In an undersea mining apparatus having a hydraulic suction conveyance duct and means for enabling moving the duct in a forward direction over the undersea floorline in the mining locale of an undersea floor area where desired mineral aggregates are dispersed at the bottom of the sea, said duct being adapted to transmit a mixture of liquids and solids by hydraulic suction flow from the duct entrance to the duct exit at a desired location, the improvement comprising in combination with the conveyance duct and the forward movement means, a liquid-solid flow transition chamber having a solids entrance, a water entrance, an exit port, and a throat portion, said chamber entrances and exit port being disposed with the solids entrance facing in the forward direction, with the water entrance facing aft, with the exit port above and longitudinally between the solids entrance and the water entrance and facing forwardly and upwardly and being joined to the entrance end of the conveyance duct and with the throat portion longitudinally between the water entrance and the exit port, the cross-sectional areas of said entrances and port being in corelationships to the cross-sectional area of the conveyance duct whereby the solids entrance area is less, the water entrance area is greater and the exit port area and throat area are equal to the conveyance duct area; and means to support the bottom of the solids entrance and the bottom of the water entrance at least as high as the undersea floorline when the conveyance duct and the chamber are moved forwardly over the undersea floorline.

3,988,844

LIGHTING SYSTEM FOR COMPATIBLE STEREO VIEWER

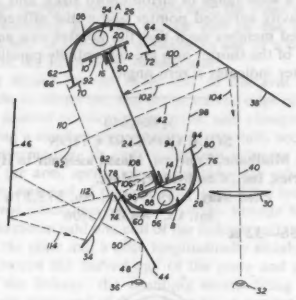
Marvin E. Lebow, 3431 E. 62nd Place, Tulsa, Okla. 74136

Filed June 9, 1975, Ser. No. 585,316

Int. Cl.² G09F *13/10*

U.S. Cl. 40—130 B **5 Claims**

1. A lighting system for illuminating a picture in a three dimensional viewer apparatus and comprising light box means provided in the interior of said viewer apparatus for directing light simultaneously to the opposite faces of said picture, illuminating means provided for said light box means for supplying said light substantially uniformally across said opposite faces of said picture, reflecting means provided for said light box means and cooperating with said illuminating means for directing the light simultaneously to the opposite faces of said picture, means precluding entry of ambient light from the exterior of the viewer into the area surrounding the picture, and masking means provided for said light box means for



blocking the path of unwanted light from said illuminating means to preclude hampering of the lighting of the picture.

3,988,845

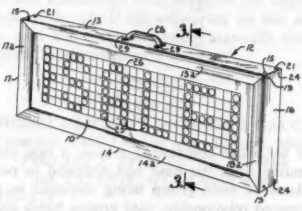
SIGN DEVICE HAVING MAGNETIC DISPLAY CHARACTERS

Billy J. Boatman, Sedalia, Mo., assignor to Sedalia Neon Company, Sedalia, Mo.

Filed Aug. 7, 1975, Ser. No. 602,790

Int. Cl.² G09F *7/04*

U.S. Cl. 40—142 A **8 Claims**



1. Display apparatus comprising:

a substantially flat backing board presenting a relatively dark background;

a plurality of thin display characters, all substantially identical to one another in size, shape, and display characters, each display character being constructed of a flexible, resilient substance and each having opposite first and second surfaces, said first surface being relatively light in color to contrast with said dark background and said second surface being substantially flat for contact with said backing board;

permanent magnet means for magnetically adhering said display characters against said backing board with said second surfaces lying flatly against said board and said first surfaces facing away from said board, thereby permitting arrangement of said display characters in selected patterns on said backing board to display messages thereon according to the patterns presented,

said permanent magnet means comprises a ferro-magnetic substance included in said backing board for attracting a magnet and permanent magnet material included in each of said display characters, said display characters thereby magnetically adhering against said backing board;

a second substantially flat backing board presenting a relatively dark background and including a ferro-magnetic substance for attracting and retaining said display characters thereon with said second surfaces lying flatly against said second board and said first surfaces facing away from said second board; and

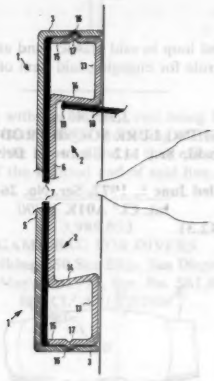
a frame supporting said backing boards a spaced distance apart to face in opposite directions, said frame extending substantially continuously around the peripheries of said backing boards.

3,988,846

FRAME FOR PICTURES OR THE LIKE

Monika Kuhling, Friedrichstrasse 37, 6200 Wiesbaden, Germany

Filed Jan. 16, 1975, Ser. No. 541,396
Claims priority, application Germany, Jan. 22, 1974, 2402941; Dec. 10, 1974, 2458463
Int. Cl.² G09F 1/12
U.S. Cl. 40—152.1 **2 Claims**



1. A frame for pictures and the like comprising

a front part of transparent flexible synthetic plastic material designed as a box cover having a face with an extending rim, and

a back part of flexible synthetic plastic material designed as a box cover having a face with a U-shaped rim having an inner side and outer side, the inner side of the U-shaped rim running obliquely in such a way that the clearance between the opposite sides is wider at the ends of the sides than at a connection of the two sides of the U-shaped rim whereby said frame may be hooked on a nail on a wall,

said back part of said frame being adapted to fit snuggly into the front part and to hold said picture between the respective faces thereof with the U-shaped rim of said back part being directed toward the front part and with the outer side of the U-shaped rim being in contact with the rim of the front part, whereby said flexible front and back parts may be simply snapped together to mount a picture and yet readily separated to remove said picture.

3,988,847

COMBINED CYLINDER-RELEASE AND SAFETY LEVER FOR REVOLVERS

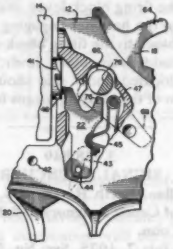
Ralph C. Kennedy, South Windsor, Conn., assignor to The Leisure Group, Inc., Los Angeles, Calif.

Filed Sept. 8, 1975, Ser. No. 611,533
Int. Cl.² F41C 17/08
U.S. Cl. 42—66 **6 Claims**

1. In a revolver having a frame with a cartridge cylinder supported both for rotation thereon and for lateral movement relative thereto into and out of an operative position, and having an action member movable through a predetermined path when the revolver is functioned to fire a cartridge, said cylinder being mounted for rotation on a spindle, one end of which is receivable in a centrally disposed passage in said frame when the cylinder is in its operative position and retractable lengthwise out of such passage in order to release the cylinder so that it can be swung laterally out of the frame, and spring means urging said spindle into said passage,

a combined cylinder-release and safety device therefor comprising in combination,

a cam shaft pivotally mounted on said frame having a cam portion in position to transmit axial motion to said spindle when said cam shaft is pivoted in one direction against the pressure of said spring means,



a stop for limiting the pivotal movement of said cam shaft in the opposite direction at a normal position,

means for circumventing said stop in order to permit pivotal movement of said cam-shaft in said opposite direction beyond said stop,

said cam shaft having a second portion movable into the path of said action member when said cam shaft is pivoted in said opposite direction beyond said stop, for positively preventing firing of said revolver, and

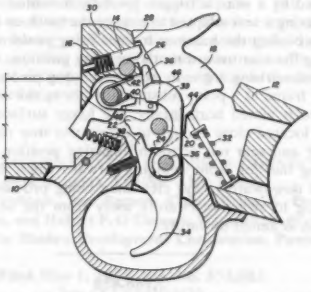
a finger-lever for manually pivoting said cam shaft.

3,988,848

SAFETY DEVICE FOR FIREARMS

Raymond E. Chatigny, Westminster, Mass., assignor to Harrington & Richardson, Inc., Gardner, Mass.

Filed Sept. 16, 1974, Ser. No. 506,169
Int. Cl.² F41C 17/00
U.S. Cl. 42—70 F **5 Claims**



1. A safety device for a firearm having a hammer, trigger, and firing pin, including a recess on the hammer causing the same normally to avoid contact with the firing pin,

a movable firing block, said firing block comprising means for transmitting pressure from the hammer to the firing pin to actuate the latter,

said firing block being movable with respect to the firing pin between an inoperative position and an operative position for firing,

means on the hammer to move the firing block into the firing position with relation to the firing pin, biassing means normally urging the firing block to the inoperative position,

and means associated with the trigger and movable therewith forming a stop to maintain said the firing block in firing position upon motion of the trigger in a firing direction, said firing block being normally in an inoperative position with relation to said firing pin, whereby the firing block is moved to an inoperative position upon the fall of the hammer without pressure on the trigger,

a pivoted firing block lever, said firing block being pivotally mounted on the firing block lever, the means to move the firing block on the hammer engaging the lever and moving the firing block to the firing block operative position,

a shoulder on said firing block lever, said stop forming means to be located under said shoulder to prevent the biassing action of the biassing means for the firing block.

3,988,849

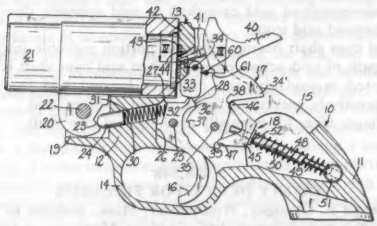
SIGNAL LAUNCHER

William J. Connellan, North Haven, and Robert L. Hillberg, Cheshire, both of Conn., assignors to Bellmore-Johnson Tool Co., Hamden, Conn.

Filed July 7, 1975, Ser. No. 593,470

Int. Cl.² F41C *17/06*

U.S. Cl. 42—70 G **4 Claims**



1. In a firearm having a frame, a hammer pivotally mounted in the frame and having at least one tooth adapted to be engaged by a sear, a trigger pivotally mounted in the frame and having a sear adapted to engage the tooth on the hammer, means biasing the hammer toward firing position and means biasing the sear toward tooth engaging position, the improvement comprising a gravity responsive dog pivotally mounted in the frame at a point substantially above the sear when the firearm is aimed horizontally, the lower surface of the dog being located close enough to the sear to stop rotation of the trigger and sear out of tooth engaging position, means preventing the dog from swinging forward when the firearm is aimed downwardly, and clearance being provided to permit the dog to swing rearwardly away from the sear when the firearm is aimed upwardly.

3,988,850

FISHING LINE TENSIONER AND TACKLE HOLDER

Richard K. Steinman, 507 E. Maryland, Phoenix, Ariz. 85012

Filed Oct. 6, 1975, Ser. No. 619,564

Int. Cl.² A01K *87/00*

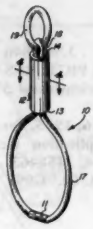
U.S. Cl. 43—25.2 **4 Claims**

1. A fishing tackle accessory for detachable securement to a fishing pole and for engaging an item of fishing tackle and maintaining tension on the fishing line; said accessory comprising:

a. a continuous elastic band; and

b. a ferrule encirculing said elastic band to form

i. a first loop in said elastic band at one end of said ferrule for circumferentially engaging said fishing pole, and



ii. a second loop in said elastic band at the other end of said ferrule for engaging said item of fishing tackle.

3,988,851

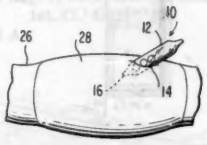
FISHING LURE SOUND PRODUCER

Max Sacharnoski, Sr., 112 Glenwood Drive, Paducah, Ky. 42001

Filed June 6, 1972, Ser. No. 260,334

Int. Cl.² A01K *85/00*

U.S. Cl. 43—42.31 **1 Claim**



1. A sound maker for a soft bodied fishing lure comprising an elongated tubular glass capsule, at least one of the ends of said capsule being pointed to facilitate forcing the capsule into the soft lure body for embedment therein, and a plurality of metal, spherical balls freely disposed in and contained by the capsule said balls being sized to rattle against the inner wall of said capsule producing a clear, resonant sound that will attract fish, the inner-diameter of said capsule being slightly larger than the diameter of said spherical balls such that the balls are disposed in a line within the capsule.

3,988,852

HOOK CONNECTOR

Gerald B. Klein, 13451 Stuart Court, Broomfield, Colo. 80020

Continuation-in-part of Ser. No. 335,081, Feb. 20, 1973, Pat. No. 3,898,760. This application Aug. 11, 1975, Ser. No. 603,347

Int. Cl.² A01K *91/04*

U.S. Cl. 43—44.83 **8 Claims**

1. A connector comprising in combination with a fishing line:

a rod-like connecting member constructed of resilient, slightly stretchable material and having at least a first axial passageway extending into it from one end, and an end opening at the other end intersecting said first passageway;

said first passageway being slightly larger in cross section than the diameter of the fishing line to receive the same;

the other end of said member being coupled to a fish handling implement to be joined with said fishing line through said member;

said first passageway extending to the end opening with the width of the end opening being at least as great as the diameter of the said first passageway but not exceeding

the diameter of a knotted end of said line, said end opening defining gripping means whereby the end of said line may be threaded into the first passageway, extended from the end opening, knotted and then pulled back into the

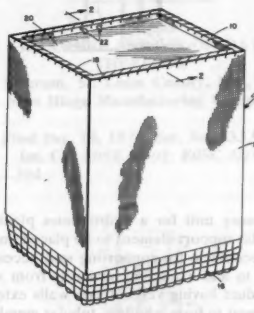
end opening with the knotted end being forced into the end opening with a slight stretching of the resilient connector about the knotted end to thus effect a tight fit and a gripping of the knotted end of said line.

3,988,853

GAME BAG FOR DIVERS

Philip George Hudkins, 350 San Elijo, San Diego, Calif. 92106

Filed May 29, 1975, Ser. No. 581,884
Int. Cl.² A01K *97/04*
U.S. Cl. 43—55 **1 Claim**



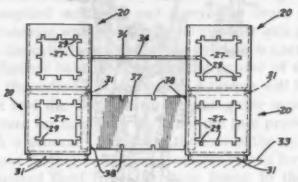
1. A game bag assembly for divers comprising;
a. a rigid frame having an opening therein substantially as large as said frame;
b. a transparent lid hinged to said frame and displaceable from a closed position covering said opening into an open position substantially within said bag;
c. a flexible bag having a water-permeable bottom portion, a substantially continuous upper edge, and a water-impermeable, flexible, smooth portion constituting the major portion of the bag and extending to said edge to prevent the gripping of said bag by crustaceans contained therein;
d. said bag being secured along its entire edge to said frame such that said bag, frame, and lid define a substantially closed chamber when said lid is closed;
e. an elastic elongated member secured to and between said frame and said lid defining a hinge and biasing said lid into said closed position; and
f. the entire assembly being adapted to be submersible.

3,988,854

STACKABLE ELEMENTS WITH LATERAL CONNECTOR

Richard O. Bartz, 7017 Mark Terrace Drive, Edina, Minn. 55435

Continuation-in-part of Ser. No. 385,090, Aug. 2, 1973, Pat. No. D237,068. This application Jan. 20, 1975, Ser. No. 542,522
Int. Cl.² A63H *33/10*
U.S. Cl. 46—26 **6 Claims**



1. An assembly of construction members comprising: a plurality of construction members, each construction member including a tubular body having a plurality of side walls joined together to form a continuous wall surrounding a passage through the body, said side walls having inside surfaces surrounding an open end of the body, at least two of said side walls each having a generally square opening completely surrounded by inner edges of said one side wall open to the passage, said inner edges having a first pair of laterally spaced and parallel edges and a second pair of laterally spaced and parallel edges, said second pair of edges being extended between and normal to said first pair of edges, a plurality of inwardly directed rectangular notches open to said opening in said first pair of edges and said second pair of edges, said notches being arranged in at least two opposing pairs having facing open ends in each pair of edges, flange means attached to and extended in the longitudinal direction from one end of the side walls, said flange means comprising a flat flange joined to each side wall and extended parallel to the side wall and longitudinally away from the side wall, each flange located inwardly of the plane of the side wall adjacent to the flange and having an outside flat surface adapted to be located in flat surface contact with the inside surface of the side wall of an identical construction member whereby the construction members can be interconnected together along the longitudinal axis of the interconnected construction members, and a connecting member releasably connectable to a pair of said construction members, said connecting member comprising a flat member having outwardly directed rectangular notches arranged in opposing pairs of notches adapted to fit into a desired one of said opposing pairs of notches in the first and second pairs of edges.

3,988,855

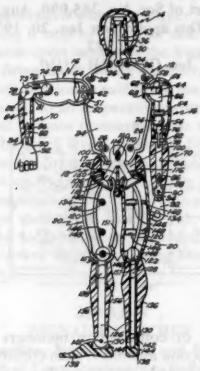
POSABLE FIGURE HAVING ONE PIECE CONNECTOR FOR TORSO, TRUNK AND LEGS

Alfred A. Crabtree, San Ramon, Calif.; Brian S. Prodger, Barrington, and Hubert P. O'Connor, Warwick, both of R.I., assignors to Hasbro Development Corporation, Pawtucket, R.I.

Filed May 1, 1975, Ser. No. 573,803
Int. Cl.² A63H *3/20*
U.S. Cl. 46—161 **16 Claims**

1. A toy figure, comprising a torso formed in a hollow shell construction, a head member mounted on the uppermost end of said torso for movement relative thereto, arms interconnected to said torso on opposite sides thereof and adjacent to the upper end thereof for movement relative thereto, said arms and head being unconnected with each other within said torso, a trunk portion received the lowermost end of said torso in interfitting relation therein, a pair of legs interconnected to said trunk portion and to the lowermost end of said torso, and

a flexible one-piece connector having an upper portion that is located substantially in said trunk portion and that is interconnected to said trunk and legs and to only the lowermost portion of said torso so as to provide tensioned interengagement between said trunk, legs and torso and to further provide that substantially the entire interior of said torso is free and unobstructed from connecting members.



3,988,856

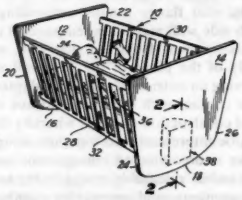
TOY MUSICAL CRADLE

Lawrence Doppelt, Great Neck, N.Y., assignor to Goldberger Doll Mfg. Co., Inc., Brooklyn, N.Y.

Filed Oct. 14, 1975, Ser. No. 622,106

Int. Cl.² A63H *5/00*

U.S. Cl. 46—175 R **2 Claims**



1. The combination of a toy rocking cradle with integral musical instrument comprising a toy cradle, said cradle having two opposed spaced apart substantially vertically oriented headboards, two opposed spaced apart substantially vertically oriented side members extending between said headboards, and a substantially horizontal bottom member supported by said side members, said bottom member being spaced above the bottom of said headboards, said headboards having curved lower edges, whereby lateral force periodically applied to at least one of said side members will cause a rocking motion of said toy cradle when said cradle is disposed on a fixed substantially horizontal surface with said curved lower edges of said headboards in contact with said surface, and a musical instrument mounted on the inner surface of said headboard entirely below said bottom member, said musical instrument being generally cylindrical with the central vertical axis of said musical instrument being juxtaposed with the central vertical axis of said headboard, said musical instrument being disposed in a semi-elliptical foraminous enclosure, said enclosure having lateral and lower openings and being attached to said headboard entirely below said bottom member, said musical instrument consisting of a freely suspended pendulum striker and a plurality of spaced apart fixed vertical chimes arranged in a circle, said striker being suspended from a mounting disposed above the center of said circle, each chime of said plurality of chimes having an individual length and pitch different from the remainder of the chimes, whereby said chimes produce a harmonious sound which is pleasant and melodious when struck in succession by said striker, when a rocking motion is imparted to said cradle.

3,988,857

ACCESSORY UNIT FOR HYDROPONICS RECEPTACLES

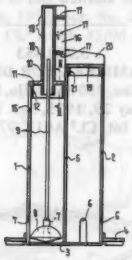
Gerhard Baumann, Bern, Switzerland, assignor to Interhydro AG, Bern, Switzerland

Filed Aug. 14, 1974, Ser. No. 497,477

Claims priority, application Switzerland, Aug. 15, 1973, 11731/73

Int. Cl.² A01G *31/02*; G01F *23/06*

U.S. Cl. 47—1.2 **2 Claims**



1. An accessory unit for a hydroponics plant receptacle comprising a flat support element to be placed on the bottom of the plant receptacle for supporting said accessory unit; a duct attached to and extending upwardly from said support element, said duct having vertical side walls extending completely thereabout to form a hollow, tubular member, a watertight partition wall connected to said vertical side walls within said duct and completely subdividing said duct vertically into a water-level indicator channel and a separate pouring-in and emptying channel, and a bottom wall for at least said indicator channel; said partition wall and said duct including said bottom wall comprising an integral, unitary piece; and indicator assembly including an indicator rod supported upon a float, said float disposed completely within said water-level indicator channel; a cover member for said water-level indicator channel, said cover member including an upwardly extending scale carrier having a scale, said indicator rod being disposed for vertical movement relative to said scale carrier and cooperating with said scale to indicate the water level therein over the entire height of said indicator channel; and openings in said vertical side walls of said duct adjacent said support element establishing communication of each of said channels exteriorly of said duct, said partition wall precluding direct communication of said channels with each other within said duct, whereby said indicator assembly provides an accurate indication of water level in the receptacle over the entire height thereof independent of the water level within said pouring-in and emptying channel.

3,988,858
METHOD OF CULTIVATING EPIPHYTICALLY GROWING PLANTS

Gerhard Bomba, Klingenbergerstrasse 5, D-6 Frankfurt am Main 70, Germany

Filed Mar. 26, 1975, Ser. No. 562,159
Claims priority, application Germany, Apr. 6, 1974, 2416791; Oct. 12, 1974, 2448729
Int. Cl.² A01G *31/00, 9/02*
U.S. Cl. 47—58 **9 Claims**

1. A method of cultivating plants capable of epiphytic culture, comprising the following steps:

a. individually attaching the plants in their early stage when they already have recognizable leaves and roots directly to a non-native soilless surface lacking open pores;

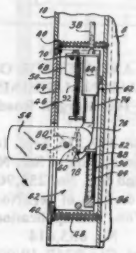
b. throughout their cultivation, maintaining the plants and the surface in a dry condition at daytime; and

c. throughout their cultivation, maintaining the plants and the surface in a wet condition from nightfall until daybreak by thorough watering.

3,988,859
ENTRY STRUCTURE AND AIR-OPERATED LOCK THEREFOR

Francis C. Peterson, St. Louis County, Mo., assignor to C. Hager & Sons Hinge Manufacturing Company, St. Louis, Mo.

Filed Dec. 18, 1974, Ser. No. 533,961
Int. Cl.² E05B *65/05;* **E05C** *3/10*
U.S. Cl. 49—394 **9 Claims**



1. In an entry structure including a door frame having a first elongated member, a door which is hinged on and moves between open and closed positions with respect to the door frame and has a second elongated member which is located opposite and in close proximity to the first elongated member of the door frame when the door is closed, the improvement including an improved lock for securing the door in its closed position, said lock comprising: a base structure mounted in a fixed position on the second elongated member; a bolt pivoted on the base structure for rotational movement between extended and retracted positions about an axis fixed in position with respect to the base structure, the bolt when in its retracted position being located substantially entirely within said second elongated member so as not to interfere with the first elongated member whereby the door may be moved to its open position, the bolt when in its extended position being projected laterally out of and beyond said second elongated member for engagement with a retaining device on the first elongated member, whereby the door is secured in its closed position, the bolt having a groove therein which is offset from the pivot axis for the bolt; a fluid cylinder mounted on the base structure with its axis generally parallel to the longitudinal axis of the elongated members and carrying a cross pin which extends crosswise with respect to the cylinder axis and moves parallel to the cylinder axis when the cylinder is energized, the cross pin further being received in the groove of the bolt so that when the cylinder is energized, a torque will be applied to the bolt and the bolt will rotate; and guide means on the base structure for confining the cross pin to a predetermined path which is generally parallel to the axis of the cylinder; the improvement further comprising transfer means for transmitting pressurized fluid from the door frame to the door to operate the lock on the door; a first fluid line extending between a source of pressurized fluid and the transfer means; and a second fluid line extending between the transfer means and the fluid cylinder of the lock.

3. A lock comprising: a rigid base structure; an elongated bolt connected to the base structure for rotational movement between extended and retracted positions about an axis of rotation which is fixed in position with respect to the base structure, the bolt when in its extended position being projected a substantial distance from the base structure but not when in its retracted position, the bolt having a groove therein which extends transversely of the bolt and is spaced from the axis of rotation; a fluid cylinder including a pair of elements which move relative to each other when the cylinder is energized, one of the elements being mounted on the base structure and the other element having a cross pin which extends parallel to the pivot axis for the bolt and is received in the groove of the bolt so that when the fluid cylinder is energized the other element will move and a torque will be applied to the bolt, causing the bolt to rotate; guide means on the base structure for confining the cross pin to a path which is substantially straight and parallel to the axis of the cylinder as the other element moves, the path being generally parallel to the longitudinal axis of the elongated bolt when the bolt is in its retracted position and being disposed at a substantial angle to the longitudinal axis of the bolt when the bolt is in its extended position so that the position of the pin relative to the groove in the bolt will change as the pin moves along the path; a pair of telescoping elements, the common axis of which is parallel to the cylinder axis, one of the telescoping elements being mounted on the base structure, and the other of the telescoping elements being carried by said other element of the fluid cylinder; and a coil-type compression spring encircling the telescoping elements and urging them apart to urge the elongated bolt to its retracted position.

3,988,860
ELECTRIC SWINGING GATE ASSEMBLY

Paul H. Nevarez, Bloomington, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 4, 1975, Ser. No. 564,983
Int. Cl.² A10K *3/00*
U.S. Cl. 49—396 **1 Claim**

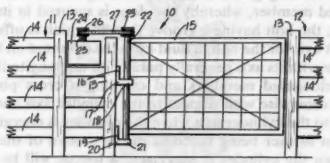
1. An improved swinging gate assembly for a fence having an end vertical post and a rectangularly shaped gate section having an end vertical rod, which comprises:

a. a ball bearing collar mounted centrally on said vertical post, said vertical rod of said gate section journaled through said bearing collar;

b. a ball member cup mounted near a bottom end of said vertical end post, a lower end of said vertical rod journaled for rotation in said bearing cup;

c. an electrical motor having an upwardly extending vertical drive shaft mounted in said fence, said vertical drive shaft extending just above an upper end of said vertical post;

d. a first pulley mounted on an upper end of said vertical end rod;



e. a second pulley mounted on an upper end of said vertical drive shaft; and

f. a horizontal pulley belt cooperating between said first and said second pulley.

3,988,861

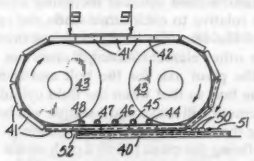
LAPPING OR GRINDING APPARATUS AND METHOD

Thomas Scott Brawley, 15 Dogwood Court, Cromwell, Conn. 06416

Continuation-in-part of Ser. No. 387,498, Aug. 10, 1973, Pat. No. 3,913,275. This application July 16, 1975, Ser. No. 596,566

Int. Cl.² B24B *5/20*

U.S. Cl. 51—3 **10 Claims**



1. Apparatus for conditioning the rolling surfaces of rolling bearing elements comprising, at least two plates having facing complementary surfaces defining at least two opposite sides of a space corresponding to an axial cross-section of the rolling bearing elements to be conditioned, means for causing high speed relative rectilinear movement of said plates continuously in a single direction, at least one of said surfaces being formed with a profiled track extending in a direction substantially parallel to the direction of relative movement of the plates, means for applying pressure to at least one of said plates and means for supplying abrasive material to said surfaces.

3,988,862

STRUCTURE FOR TOTAL FORM ABRASION MACHINING

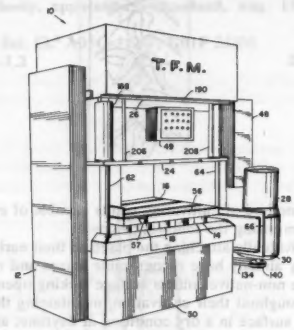
Thomas J. O'Connor, 100 Morgan Road, Ann Arbor, Mich. 48106

Division of Ser. No. 633,614, Nov. 20, 1975, which is a continuation of application Ser. No. 397,336, Sept. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 68,711, Sept. 1, 1970, and Ser. No. 253,906, May 16, 1972, which is a division of Ser. No. 545,652, April 27, 1966, Pat No. 3,663,786. This application Mar. 11, 1976, Ser. No. 666,001

Int. Cl.² B24B *19/00*

U.S. Cl. 51—157 **6 Claims**

1. Structure for total form abrasion machining comprising a cutting master having an abrasive mirror image surface of an exact size form to be machined in a friable workpiece which is different in size than the form to be machined by an exact predetermined amount, means for supporting the cutting master over the friable workpiece, means operable between the cutting master and workpiece for imparting a relative rotary, orbital motion between the cutting master and workpiece, comprising at least one eccentric structure operably located between a table carrying one of the workpiece and cutting master and a fixed support including a sleeve, a spindle rotatably mounted in the sleeve having a recess in one end thereof concentric with the axis of rotation of the spindle, an eccentric member comprising a disc having a first cylindrical portion on one side thereof received within the recess of the spindle which has an axis of generation concentric with the axis of rotation of the spindle and an eccentric cylinder on the other side of the disc which has an axis of generation which is



offset with respect to the axis of generation of the first cylindrical portion, and second bearing means secured to the table and engaged with the eccentric cylindrical portion of the eccentric member, bearing means supporting the table and drive train means for rotation of the eccentric structure, means also operable between the cutting master and workpiece for moving the cutting master and workpiece toward each other to engage the abrasive mirror image surface of the cutting master with the friable workpiece, and means for flushing between the abrasive surface of the cutting master and workpiece to remove particles of the workpiece abraded from the workpiece by the cutting master in the absence of a difference in electrical potential between the cutting master and workpiece.

3,988,863

STRUCTURE FOR AND METHOD OF TOTAL FORM ABRASION MACHINING

Thomas J. O'Connor, 100 Morgan Road, Ann Arbor, Mich. 48106

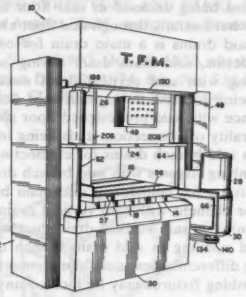
Continuation of Ser. No. 397,336, Sept. 14, 1973, abandoned, which is a continuation-in-part of Ser. Nos. 68,711, Sept. 1, 1970, abandoned, and Ser. No. 253,906, May 16, 1972, abandoned, each is a division of Ser. No. 545,652, April 27, 1966, Pat. No. 3,663,786. This application Nov. 20, 1975, Ser. No. 633,614

Int. Cl.² B24B *19/00*

U.S. Cl. 51—157 **17 Claims**

1. Structure for total form abrasion machining comprising a cutting master having an abrasive mirror image surface of an exact size form to be machined in a friable workpiece which is different in size than the form to be machined by an exact predetermined amount, means for supporting the cutting master over the friable workpiece, means operable between the cutting master and workpiece for imparting a relative rotary, orbital motion between the cutting master and workpiece, means also operable between the cutting master and workpiece for moving the cutting master and workpiece toward each other to engage the abrasive mirror image surface of the cutting master with the friable workpiece, means for

flushing between the abrasive surface of the cutting master and workpiece to remove particles of the workpiece abraded from the workpiece by the cutting master in the absence of a difference in electrical potential between the cutting master and workpiece and means operable between the cutting master and workpiece for pulsing at least one of the cutting master and workpiece to move them away from each other periodically during machining to aid the flushing between the cutting master and the workpiece.



3,988,864

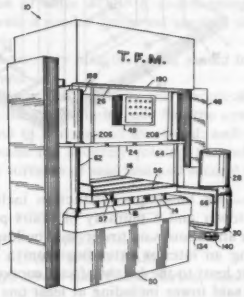
STRUCTURE FOR AND METHOD OF TOTAL FORM ABRASION MACHINING

Thomas J. O'Connor, 100 Morgan Road, Ann Arbor, Mich. 48106

Continuation of Ser. No. 397,336, Sept. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 68,711, Sept. 1, 1970, abandoned, and Ser. No. 253,906, May 16, 1972, abandoned, said Ser. No. 68,711, and said Ser. No. 253,906, each is a division of Ser. No. 545,652, April 27, 1966, Pat. No. 3,663,786. This application Nov. 20, 1975, Ser. No. 633,615

Int. Cl.[2] B24B *19/00*

U.S. Cl. 51—157 **10 Claims**



1. Structure for total form abrasion machining comprising a cutting master having an abrasive mirror image surface of an exact size form to be machined in a friable workpiece which is different in size than the form to be machined by an exact predetermined amount, means for supporting the cutting master over the friable workpiece, means operable between the cutting master and workpiece for imparting a relative rotary, orbital motion between the cutting master and workpiece, means also operable between the cutting master and workpiece for moving the cutting master and workpiece toward each other to engage the abrasive mirror image surface of the cutting master with the friable workpiece, means for flushing between thee abrasive surface of the cutting master and workpiece to remove particles of the workpiece abraded from the workpiece by the cutting master in the absence of a difference in electrical potential between the cutting master and workpiece and means operable between the cutting master and workpiece for locking the cutting master and workpiece in one position relative to each other in movement toward each other in response to the desired form being abraded into the workpiece.

3,988,865

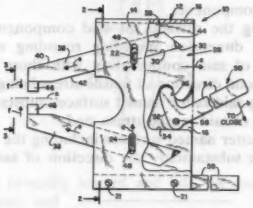
CLAMP AND JIG FOR USE THEREWITH

Charles Weisman, 125 N. Montgomery St., Valley Stream, N.Y. 11580

Continuation-in-part of Ser. No. 337,375, March 2, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,321

Int. Cl.[2] B24B *19/00*

U.S. Cl. 51—228 **11 Claims**



1. A clamp for holding a workpiece, said clamp comprising:

a. a housing;

b. a linearly movable carrier slidably mounted in said housing;

c. actuator means for causing relative movement between said housing and said carrier;

d. first and second arms including, respectively integral first and second jaw means having gripping surfaces in opposition to each other for holding the workpiece therebetween, said arms being capable of being stressed under strain to bend them into an arcuate shape while holding the workpiece; and

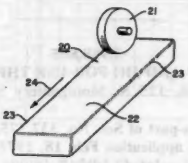
e. means for drivingly coupling at least one of said arms and the jaw means integral therewith to said carrier for displacement thereby and to said housing for limiting said coupled jaw means to linear movement in a direction perpendicular to the direction of movement of said carrier whereby the plane of said coupled jaw means is always parallel to the plane of the workpiece, said linear movement of said coupled jaw means being towards a clamping position adjacent said other jaw means and away therefrom when there is relative displacement between said housing and said carrier, and wherein said means for coupling said arm to said carrier and to said housing comprises an elongated slot in said housing and a pin integral with said arm and in engagement with said slot, the axes of said slot being substantially perpendicular to the direction of movement of said carrier, said coupling means further including guide means for displacing said one arm along a path at an acute angle to the direction of movement of said carrier comprising an elongated recess in said carrier, the recess in said carrier having generally opposed side walls, at least a portion of which bear against a portion of said arms.

3,988,866

HIGH DENSITY CERAMIC TURBINE MEMBERS

Claude R. Booher, Jr., West Chester, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 25, 1975, Ser. No. 561,731
Int. Cl.[2] B24B *1/00*; B21K *3/04*
U.S. Cl. 51—283 3 Claims



1. A high density ceramic rotating air foil component of a turbine subjected during its use to forces resulting in a known direction of tensile stress, said component produced by:

forming ceramic material to the general desired configuration of said component;

surface finishing the surfaces of said component to the desired final dimension including rounding otherwise sharp edges of said configuration with those surfaces extending in said direction of tensile stress being finished by machining said latter named surfaces substantially in the direction of said tensile stress, and;

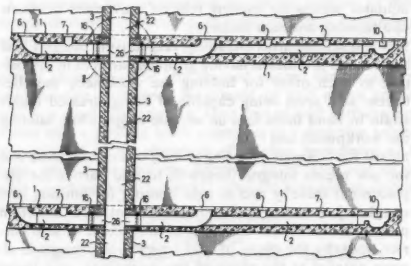
polishing said latter named surfaces including the edges by burnishing in substantially the direction of said tensile stress.

3,988,867

DRAIN AND DUCT SYSTEM FOR BUILDINGS

Olavi Väänänen, Porttikuja 2 F 68, 00940 Helsinki 94, Finland

Filed Nov. 18, 1974, Ser. No. 524,819
Claims priority, application Finland, May 18, 1973, 1623/73
Int. Cl.[2] E04B *5/48*
U.S. Cl. 52—221 4 Claims



1. A drain and duct system for sanitary and plumbing fixtures of a building having a ready-furnished concrete floor element into which drains which are in fluid connection with connection studs have been concreted, both the branch drains and the studs being encased in the ready-furnished concrete floor element in accordance with a predesigned floor space plan for positioning the fixtures on said floor space, said floor element containing an opening for receiving a vertical duct, the system comprising:

a. vertical duct elements stacked one upon the other and fitted into said opening in said floor element, said vertical duct elements having a plurality of vertical ducts therein, one of said vertical ducts constituting a vertical drain, said vertical drain duct containing an opening therein, and one of said vertical ducts constituting a ventilation duct;

b. said ready-furnished concrete floor element being furnished with said encased drains and said encased connection studs;

c. said drains being encased in said floor element to run generally horizontally through said floor element wherein one of said drains is a main drain for connecting with branch drains, said main drain having an opening for connecting with said vertical drain duct, said branch drains being located throughout said floor element in accordance with said predesigned floor space plan;

d. said plurality of connection studs being in fluid connection with said branch drains for connecting said sanitary and plumbing fixtures with said branch drains; and

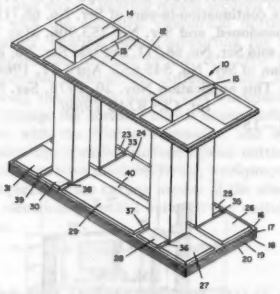
e. a pipe stump for connecting said main branch drain in said floor element with said vertical drain duct utilizing said opening in said vertical drain duct which coincides with said opening in said main branch drain, whereby selecting differently designed floor elements, said sanitary and plumbing fixtures may be located anywhere on said floor space.

3,988,868

SUPPORT FOR FLOOR TO HOLLOW CORE TOWER

Allan S. Labie, New York; Irwin Paul Lew, Forest Hills; Charles H. Thornton, and Abraham Gutman, Old Bethpage, all of N.Y., assignors to International Environmental Dynamics, Inc., New York, N.Y.

Filed Mar. 4, 1975, Ser. No. 555,313
Int. Cl.[2] E04H *1/04*; E04B *1/35*
U.S. Cl. 52—236 15 Claims



1. A concrete building construction including a central supporting tower and a plurality of floors peripherally supported from and about said tower, said building comprising: a tower having an interior extending from a foundation at a lower end at least to the height of said supported floors at its upper end; said tower including at least one extending from said foundation to the level of said supported floors, a floor having a major supporting surface constructed to abut said tower having an edge defining a continuous vertical interface with said vertical sidewall of said tower, said floor reinforced to span outwardly from a support at said edge from said tower; and, tension support means having upper and lower ends said edge, each said tension support means attached to the interior of said tower at said upper end and to said floor at said lower end and extending angularly downward from said tower to said floor proximate one respective edge to provide a first vertical support component to maintain said floor at its supported elevation to said tower and a second horizontal support component to urge said edge of said floor laterally against said tower sidewall to produce compression at the continuous vertical interface of said edge to said tower to produce a static

coefficient of friction at said vertical support component for said floor.

3,988,869

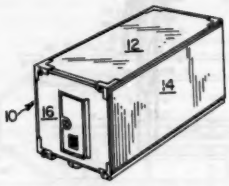
PANEL END STRUCTURE AND PANEL JOINT

Orvil Tuttle, Los Angeles, Calif., assignor to Brunswick Corporation, Skokie, Ill.

Division of Ser. No. 410,993, Oct. 30, 1973, abandoned. This application Dec. 12, 1974, Ser. No. 532,036

Int. Cl.² E04B *1/00, 5/00, 7/00*

U.S. Cl. 52—285 **4 Claims**



1. A joint for two panels each having first and second generally parallel metallic sheets separated by a thermally and electrically insulating core, the joint comprising:
   a. first and second panel end structures each comprising:
      1. a portion of each of said first and second sheets extending beyond said core to form first and second sheet ends;
      2. an elongated metallic unitary member having five planar sides in cross section, side **1** being parallel to side **3**, side **2** connecting sides **1** and **3** and being perpendicular to side **1**, sides **4** and **5** meeting sides **1** and **3** respectively at obtuse angles, side **4** meeting and being perpendicular to side **5**, one of sides **4** or **5** having a planar self-aligning joining surface mateable with a similar surface on another similar unitary member, and a planar extension to the side having the self-aligning joining surface extending the joining surface beyond the junction of sides **4** and **5** and forming a flange mateable with a similar flange on another similar unitary member;
      3. side **4** of the unitary member being joined to said first sheet end; and
      4. insulating means for thermally and electrically insulating and mechanically joining side **5** of the unitary member from and to said second sheet end; and
   b. fastening means for securely joining the self-aligning planar joining surfaces of said first and second panel end structures.

3,988,870

LAMP POST BASE

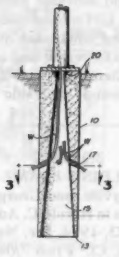
Donald D. Snavely, 6942 Knollwood Drive, Morrow, Ga. 30260

Continuation of Ser. No. 463,855, April 25, 1974, abandoned. This application July 2, 1975, Ser. No. 592,644

Int. Cl.² E04H *12/00;* **E02D** *27/00*

U.S. Cl. 52—296 **2 Claims**

1. A lamp post base for receiving and supporting a hollow upstanding electrical lamp post by its bottom flange so that electrical conduits may pass up through the bottom flange and into the hollow interior of said lamp post, comprising:
   a. a hollow concrete member having a cylindrical exterior surface and a conical upwardly tapered interior wall forming a bore therethrough, said member being substantially longer than its width and being provided with a flat upper end surface having a central aperture forming the upper opening of said bore and a bottom surface of less surface area than said upper end surface, said bottom surface having a central aperture and forming the lower end of said bore, said upper surface being adapted to receive thereon said flange of said lamp post so that said bore communicates with the hollow portion of said lamp post when said member is aligned with said upper opening;
   b. said concrete member being provided with circumferentially spaced passageways extending from said exterior surface inwardly to said interior wall for communicating with the central portion of said bore and for receiving therethrough the electrical cables which then pass up through said bore and into the hollow portion of said lamp post, said passageways each being spaced inwardly from and disposed between said upper end surface and said bottom surface and extending at an incline as it



passes inwardly toward and into the central portion of said bore; and
   c. a plurality of circumferentially spaced anchor bolts embedded in said member, said bolts surrounding said upper central aperture of said upper surface for projecting upwardly through holes in said flange when said flange is received on said upper end surface and is in alignment with said bore;
   d. said upper opening having a plastic eyelet having a tubular section secured to a portion of said aperture interior adjacent said upper end surface and a flange portion secured to said upper end surface, said plastic eyelet flange portion being countersunk in an annular recess in said upper end with an exterior surface of said flange portion disposed coplanar with the exterior surface of said upper end.

3,988,871

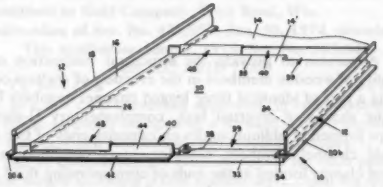
SUSPENDED CEILING CONSTRUCTION

Henry Moomey, 4693 Marshall, SE., Kentwood, Mich. 49508

Continuation-in-part of Ser. No. 407,802, Oct. 9, 1973, Pat. No. 3,863,413. This application Feb. 3, 1975, Ser. No. 546,309

Int. Cl.² E04B *5/55*

U.S. Cl. 52—484 **12 Claims**



1. A suspended ceiling construction for buildings comprising:
   first and second parallel support beams suspended from a structural ceiling within said building;

a plurality of ceiling tiles suspended between said parallel support beams;

means for releasably supporting one end of said ceiling tiles on said first support beam;

said tiles having kerfs along opposite edges thereof extending between said first and second support beams;

spline means in said kerfs and extending between adjacent tiles, said spline means having means for supporting said spline means on said second support beam so that said tiles are supported at an end opposite said one end through the spline means;

at least one of said tiles being cut away above said kerf along a portion of each side of said one tile and forming an opening above said kerf; and

said spline means including a movable member slidable between a locking position engaging the kerf at the side of one tile and a release position at said cut-away portion of said one tile, said movable member having a flange which engages said kerf of said one tile and sized to pass through said opening when said movable member is in said release position to permit said one tile to be removed from said ceiling when the movable members are moved to the release position at each side of one tile.

3,988,872

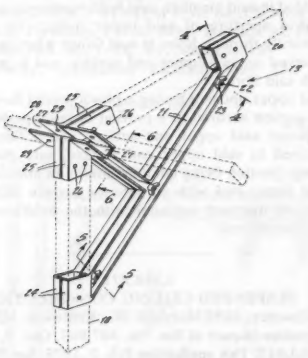
PORTABLE BUILDING FRAME CONNECTOR

Harold C. Adamson, Sayville, and George Spector, New York, both of N.Y., assignors to Harold C. Adamson, Sayville, N.Y.

Filed Apr. 23, 1974, Ser. No. 463,304

Int. Cl.² F16B *7/04*

U.S. Cl. 52—752 **4 Claims**



1. Apparatus to provide the structural connection of a plurality of wooden members in the erection of shelters comprising a pair of identical three legged channel members having the shapes of inverted tees, complementary U-shaped clamps formed at oblique angles on opposite ends of two legs of said channel members, complementary combination U-shaped clamps formed at the ends of corresponding third legs of said channel members, and means for fastening the complementary bases of said channel members to rigidly clamp and position each of said plurality of wooden members by said complementary combination U-shaped clamps and at least two of said plurality of wooden members by means of said complementary U-shaped clamps.

3,988,873

METHOD FOR ENCLOSING A CONTAMINATED ARTICLE IN A STERILE CONTAINER

Maynard F. Oliverius, 537 Oakley, Topeka, Kans. 66606

Division of Ser. No. 454,761, March 25, 1974, Pat. No. 3,941,245. This application Oct. 15, 1975, Ser. No. 622,769

Int. Cl.² B65B *5/04, 7/02*

U.S. Cl. 53—27 **6 Claims**

1. A method for enclosing non-sterile material within a sterile container comprising:

a. providing a sterile container characterized by having a cavity therein with an access opening to the cavity and sealable adjacent the access opening to close the cavity in response to pressure on exterior surfaces of the sterile container;

b. providing a tubular insert characterized by having one end thereof within the cavity within the sterile container and the other end thereof in a protective position over exterior surfaces of the sterile container adjacent the access opening thereto;

c. holding the sterile container by a sterile person;

d. moving non-sterile material into the sterile container by moving same into the insert in such a manner that the other end of insert protects the sterile container to avoid contact of the non-sterile material with exterior surfaces of the sterile container and with the sterile person;

e. moving the insert from the protective position adjacent the access opening to the sterile container while the sterile person holds the sterile container and in a manner to avoid contact of interior surfaces of the insert with exterior surfaces of the sterile container and with the sterile person; and

f. sealing the sterile container adjacent the access opening after moving the insert from the protective position adjacent the access opening to the sterile container by exerting inwardly directed pressure on exterior surfaces of the sterile container adjacent the access opening and thereby enclose the non-sterile material in the sterile container.

3,988,874

POULTRY WEIGHING AND PACKING APPARATUS

William F. Altenpohl, and Paul J. Altenpohl, both of Union Hill Road, West Conshohocken, Pa. 19428

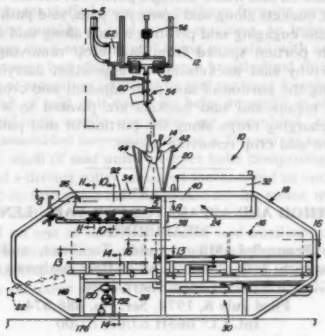
Filed Apr. 22, 1975, Ser. No. 571,005

Int. Cl.² B65B *57/20;* **G06M** *7/04*

U.S. Cl. 53—59 W **13 Claims**

1. In combination with a container filling machine in which objects are compacted within a storage zone by strokes of a ram and objects accumulated within the storage zone are transferred to a container, a control system including first counter means for counting the strokes of the ram, means responsive to completion of a preset count by the first counter means for effecting said transfer of accumulated objects in the storage zone to the container, second counter means for counting a preset number of said transfers of compacted objects to the container, reset means responsive to completion of the preset count by each of the counter means for terminating operation of the counter means, means responsive to the

completion of said preset count by the second counter means for continuing supplemental operation of the first counter means, and means responsive to a preset supplemental count



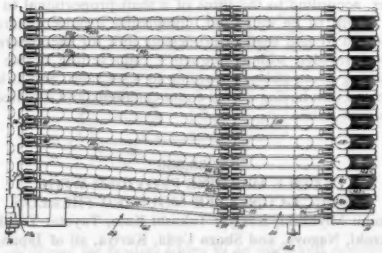
by the first counter means for transferring the accumulated objects in the storage zone to the container to complete filling thereof.

3,988,875

APPARATUS FOR PRODUCING AND PACKAGING FOOD CHIPS

Rudolph J. Fay, Cincinnati, Ohio, assignor to J. W. Fay & Son, Inc., Cincinnati, Ohio

Filed Nov. 5, 1975, Ser. No. 628,895
Int. Cl.² B65B *35/30*
U.S. Cl. 53—123 **47 Claims**



1. Apparatus for use in combination with a system for manufacturing and packaging potato chips, which system is operative to mix a potato base dough, roll said dough into a flat sheet, cut said dough sheet into closely spaced columns of individual dough chips, and pass said closely spaced columns of dough chips through a chip fryer to convert said dough chips into columns of substantially identically shaped crisp potato chips, which apparatus comprises

means for moving a predetermined quantity of each of said columns of crisp potato chips into a stack in which the potato chips of each stack are in face-to-face juxtaposition, and

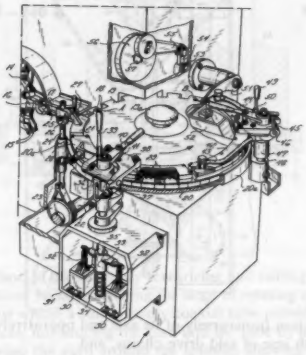
means for wrapping a flexible, impermeable wrapper around each of the stacks and for closing the edge and ends of the wrapper to form a completed wrapped and sealed package of a stack of potato chips.

3,988,876

DEVICE FOR SEALING WRAPPERS OF CANDIES AND THE LIKE

Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Italy

Filed Mar. 20, 1975, Ser. No. 560,137
Int. Cl.² B65B *11/36*
U.S. Cl. 53—124 A **10 Claims**



1. Apparatus for shaping plastic products, such as candies produced from a candy rope, and for heat sealing wraps thereon in tip-style, comprising:

a generally horizontal conveyor having upwardly and radially outwardly open pockets of parallelepiped shape, each receptive of a radially inwardly introduced plastic product wrapped in a heat-sealable wrap with folds providing tips upwardly exposed in the pocket; means for intermittently moving the conveyor to transfer the products to successive halting positions, at successive stations along the conveyor;

a presser plate disposed at a first of the successive stations and overlying a pocket and adjacent portions of the conveyor when the conveyor is in one of the halting positions; means for reciprocating the presser plate downwardly onto the conveyor and back upwardly away from the conveyor in synchronism with the halting of the conveyor in the halting positions to conform each product with the respective parallelepiped shape of the pocket and to sharpen the folds of the tips of the wrap; and

heat-sealing means disposed at further ones of the successive stations for heat-sealing each tip to an adjacent portion of the wrap, on the product so conformed with said parallelpiped shape.

3,988,877

ROW CROP HARVESTER

Virgil B. Martin, and Dean E. Seefeld, both of West Bend, Wis., assignors to Gehl Company, West Bend, Wis.

Continuation of Ser. No. 437,957, Jan. 30, 1974, abandoned. This application June 4, 1975, Ser. No. 583,640
Int. Cl.² A01D *73/00*
U.S. Cl. 56—11.6 **9 Claims**

1. In a row crop harvesting apparatus, in combination:

a frame assembly comprising a forward section presenting a central and two lateral crop feeding passages;

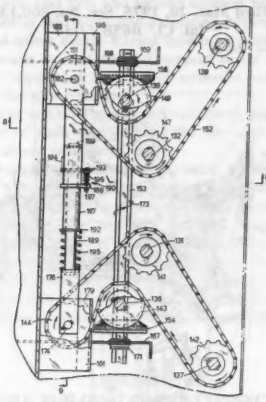
a pair of complementary crop conveyors for each passage;

first means including a first endless drive chain for driving the pair of conveyors for one of said lateral passages and for driving one of the conveyors for said central passage;

second means including a second endless drive chain for driving the pair of conveyors for the other of said lateral passages and for driving the other of the conveyors for said central passage;

power transmitting means operatively connected with said first and second means to effect driving thereof;

a pair of idler sprockets mounted on said frame assembly, each idler sprocket being reciprocably movable in a direction transversely of its axis and operatively associated with one of said drive chains; and



biasing means operatively connected between said pair of reciprocably moveable idler sprockets so as to tension said first and second drive chains.

3,988,878

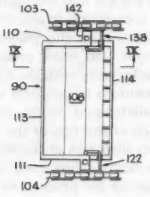
CONVEYOR MEANS FOR HARVESTING MACHINES

Vito M. Mecca, North Collins, N.Y., assignor to Mecca Bros. Inc., North Collins, N.Y.

Filed May 8, 1975, Ser. No. 575,519

Int. Cl.² A01D *46/00*; B65G *17/16*

U.S. Cl. 56—330 **15 Claims**



1. In a harvesting machine including an ambulatory supporting frame adapted for movement along a row of plants and having means for removing crops from the plants, a conveyor system comprising:

a. means on said frame defining a conveyor path having a portion adjacent said crop removing means and a portion spaced from said crop removing means;

b. a plurality of buckets for receiving and carrying removed crops;

c. supporting means operatively associated with each of said buckets and engaging said path defining means for movement along said conveyor path, said supporting means allowing pivotal movement of said buckets, each of said supporting means comprising shaft means at each end of said bucket and pivotally connected to said bucket, bearing means operatively connected on said shaft means for engaging said path defining means, and means extending from said shaft means for engaging said bucket at a location spaced from the pivotal connection of at least one of said shaft means to said bucket for limiting pivotal movement of said bucket along the portion of said conveyor path adjacent said crop removing means;

d. means for moving said buckets along said conveyor path; and

e. pivoting means on said buckets for engaging cooperating means on said frame during a portion of the movement of said buckets along said conveyor path, said path defining means engaging said pivoting means along said conveyor path portion spaced from said crop removing means, whereby said buckets are in a position carrying crops along the portion of said path adjacent said crop removing means and said buckets are pivoted to a position discharging crops along the portion of said path spaced from said crop removing means.

3,988,879

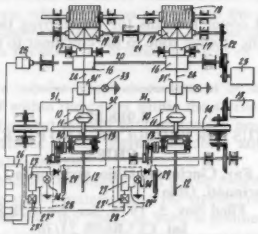
METHOD AND APPARATUS FOR YARN LENGTH MEASURING

Luciano Franzolini, Milan; Guido Tarabuso, and Claudio Ostrogovich, both of Genoa, all of Italy, assignors to Nuova San Giorgio S.p.A., Genoa-Sestri, Italy

Filed July 8, 1974, Ser. No. 486,674

Int. Cl.² B65H *63/08*, *61/00*

U.S. Cl. 57—34 R **19 Claims**



8. An apparatus for yarn length measuring in textile machines, according to the turns of a shaft proportional to the yarn length to be measured, comprising a pulse generator connected to said shaft, a processing unit for the generated pulses, provided with a frequency ratio setting device for outputting count pulses according to a set ratio, and at least one count unit having a fixed count capability and supplied by said count pulses.

3,988,880

TEXTILE MACHINE PROVIDED WITH PRODUCT-CONVEYER MOUNTED THEREON

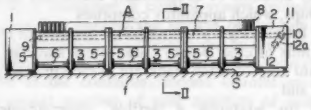
Tsutomu Miyazaki, Kariya; Takashi Kato, Toyota; Yoshihisa Suzuki, Nagoya, and Shozo Ueda, Kariya, all of Japan, assignors to Daiwa Boseki Kabushiki Kaisha, Osaka and Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, both of, Japan

Filed Nov. 26, 1974, Ser. No. 527,502

Claims priority, application Japan, Nov. 29, 1973, 48-134162; Nov. 29, 1973, 48-134163; Dec. 3, 1973, 48-135956; Dec. 4, 1973, 48-135963

Int. Cl.² D01H *9/00*

U.S. Cl. 57—34 R **7 Claims**



1. In a textile machine made by asembling a plurality of unit machines as one body in an aligned condition; each unit ma-

chine provided with a plurality of machine units, each machine unit provided with a package forming mechanism; assembled unit machines sandwiched by a pair of head stocks; said textile machine provided with a main driving motor and a power transmission mechanism and other auxiliary devices mounted on one of said head stocks and means for conveying yarn packages doffed from said package forming mechanisms toward the outside of said textile machine, an improvement comprising each machine unit being provided with a separate unit conveyor belt disposed along a longitudinal direction of said unit at a position adjacent to said package forming mechanisms, all of said unit conveyer belts arranged in alignment when said unit textile machines are assembled, so that a straight assembled conveying means is formed on said textile machine, each of said unit conveyer belts comprising a guide roller and a driving roller mounted thereon and an endless belt mounted on said guide roller and said driving roller, means for rotating said driving roller, an auxiliary conveyer belt mounted on one of said head stocks, said auxiliary conveyor belt positioned at the outside of the downstream terminal of said assembled conveyor means and aligned in substantially the same direction as said unit conveyor belts.

3,988,881

DEVICE FOR FEEDING FIBERS TO UNITS FOR SPINNING FREED FIBERS

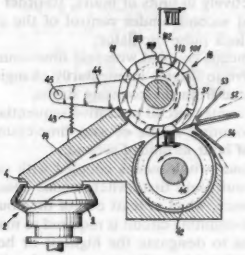
Yves Juillard, and Jacques Le Chatelier, both of Mulhouse, France, assignors to Societe Alsacienne de Constructions Mecaniques de Mulhouse, Mulhouse Cedex, France

Filed July 8, 1975, Ser. No. 593,943

Claims priority, application France, July 9, 1974, 74.23763

Int. Cl.² D01H *1/12*

U.S. Cl. 57—58.91 **17 Claims**



1. A device for feeding fibres to an open-end spinning device comprising retaining means for retaining a sliver of fibres and having an outlet; a rotary drafting drum located at said outlet from said retaining means; a pressure roller, said drafting drum rolling against said pressure roller for separating the fibres of the sliver from one another; means for generating a gaseous current flowing from said outlet for carrying the fibres toward said spinning unit; said drafting drum comprising a rotary shaft having an axis, a set of disks stacked on said shaft, at least one portion of each disk having a smooth peripheral edge which forms a fibre-separating ridge element extending in a circumferential direction in a plane perpendicular to said axis over only part of the periphery of said drum, two successive fibre-separating elements being distant from one another in an axial direction by an internal to form narrow deep grooves for the passage of said gaseous current around said drum, the axial width of said interval being small enough for at least one fibre-separating ridge element to be present in any geometrical plane perpendicular to said axis along the axial length of the set of disks.

3,988,882

METHOD AND APPARATUS FOR SIMULTANEOUSLY TEXTURIZING AND CUTTING CONTINUOUS YARNS

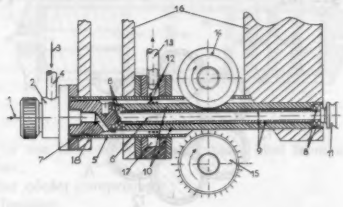
Rene Guillermin, Bron; Jean Joly, Craponne, and Sylvio Sangalli, Caluire, all of France, assignors to Rhone-Poulenc-Textile, Paris, France

Filed June 5, 1975, Ser. No. 583,913

Claims priority, application France, June 10, 1974, 74.20252

Int. Cl.² D02G *1/00, 3/00*

U.S. Cl. 57—140 R **9 Claims**



1. A method of continuously texturizing and cutting at least one continuous yarn, comprising the steps of rotating a spindle about its axis within a substantially coaxial tube provided with lateral orifices; introducing the yarn into the tube by means of a fluid to wind the yarn around the spindle; allowing at least part of the fluid to escape through said lateral orifices to form a piled-up wad of filamentary material; cutting the wad within the tube to form cut yarns, and removing the cut yarns from the tube.

3,988,883

STRETCH-RESISTANT BULKED YARN

Benjamin Chiatse Sze, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 651,018, April 5, 1957, abandoned. This application Aug. 14, 1963, Ser. No. 303,214

Int. Cl.² D02G *3/04*; D02J *1/22*

U.S. Cl. 57—140 BY **10 Claims**

1. An improved bulky substantially non-elastic yarn for use under certain given conditions, said yarn comprising, in combination, a plurality of substantially straight continuous filaments of a first polymeric composition having low extensibility under said conditions, and a plurality of helically crimped continuous composite sheath-core type filaments of greater length than said straight filaments, co-spun from a common spinneret with said plurality of straight filaments and evenly mixed with filaments of said first plurality, each of said composite filaments comprising a first longitudinally extending component of a second polymeric composition having an extensibility under said given conditions significantly greater than said filaments of said first composition, each of said composite filaments further comprising a second longitudinally extending component in engagement with said first component and of a third polymeric composition, and straight filaments of low extensibility providing stress-bearing stretch-

resistant properties to the yarn sufficient to resist a stress of 0.00065 gram per denier on the yarn and cooperating with said crimped composite filaments to produce in said yarn increased bulk, covering power, and resistance to stretch.

3,988,884

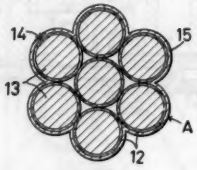
METHOD OF MAKING A WIRE ROPE

Shigeharu Kikugawa, No. 781, Sawa, Kaizuka, Osaka, Japan

Filed Oct. 10, 1974, Ser. No. 513,638

Int. Cl.² D07B 7/14

U.S. Cl. 57—162 **1 Claim**



1. A process of making a wire rope comprising the steps of:
a. electroplating a plurality of wire strands with zinc to a predetermined thickness;
b. extending the strands by cold working to a predetermined diameter;
c. twisting the strands into a wire rope; and,
d. electroplating a tin film over the finished rope covering the outer surface of the rope.

3,988,885

DIGITAL TIMER MEANS AND METHOD OF MAKING THE SAME

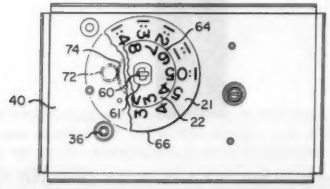
Paul T. Flumm, Oakville, and Vernon B. Harris, Waterbury, both of Conn., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 390,024, Aug. 20, 1973. This application Oct. 21, 1974, Ser. No. 516,825

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² G04F 3/02

U.S. Cl. 58—21.13 **7 Claims**



1. A digital timer comprising frame means, timer means carried by said frame means, drive means carried by said frame means for driving said timer means, setting means carried by said frame means to set a selected period of time of said timer means, and means for interconnecting said drive means and said timer means together to cause said drive means to drive said timer means for only said set period of time, said timer means having digital reading means for indicating the set period of time thereof, said reading means comprising two concentrically disposed different sized discs having time indicating indicia on the outer peripheries thereof, the small disc having said time indicating indicia comprising numerals from 0 to 9 to respectively represent unit minutes, the larger disc having time indicating indicia comprising numerals from 0 to 5 and 1:0 to 1:5 to respectively represent tens of minutes coupled respectively with no hours and 1 hour whereby said timer means can be set for a desired period of time between 1 minute and 1 hour and 59 minutes.

3,988,886

TIME SETTING DEVICE FOR AN ELECTRONIC WATCH

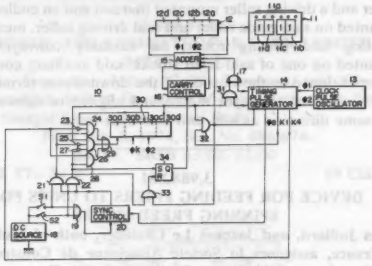
Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Aug. 9, 1974, Ser. No. 496,196

Claims priority, application Japan, Aug. 14, 1973, 48-90502; Oct. 9, 1973, 48-113418

Int. Cl.² G04C 3/00

U.S. Cl. 58—23 R **5 Claims**



1. A time-setting device for an electronic watch comprising:
a clock pulse oscillator for generating clock pulses with an accurate frequency;
a time-counting circuit coupled with said clock pulse oscillator and including a plurality of cascade-connected counting stages operative to effect time-counting operations respectively in units of hours, 10-order of minutes, minutes and seconds under control of the clock pulses from said clock pulse oscillator;
time display means coupled with said time-counting circuit and operative to display momentarily changing time signals generated from the counting stages;
an auxiliary counter circuit operative sequentially to designate the counting stages of said time-counting circuit from unit of hour to unit of second;
first and second switch means coupled with said auxiliary counter circuit, said first switch means being first actuated only once, when at least one of the counting stages of said time-counting circuit is required to make a correct count, so as to designate the hightest or hour-counting stage through said auxiliary counter circuit thereby to automatically to start supplying to the designated hour-counting stage time-correction pulses of a predetermined frequency obtained by frequency-dividing the clock pulses, and said second switch means being first actuated, when the hour-counting stage makes a correct count, so as to stop supplying the time-correction pulses of the hour-counting stage and to designate the second or **10-order** minute-counting stage of said time-counting circuit through said auxiliary counter circuit thereby automatically to start supplying the time-correction pulses to the designated **10-order** minute-counting stage, said second switch means being secondly actuated, when the **10-order** miinutes-counting stage makes a correct count, so as to stop supplying the time-correction pulses to the **10-order** minutes-counting stage to designate the third or minutes-counting stage of said first time-counting circuit through said auxiliary counter circuit thereby automatically to start supplying the time-correction pulses to the designated minutes-counting stage, said second switch means being actuated further, when the designated minute-counting stage makes a correct count, so as to stop supplying the time-correction pulses to the minutes-counting

stage and to designate the lowest or second-counting stage of said first time-counting circuit through said auxiliary counter circuit thereby to clear the designated second-counting stage, and said second switch means being finally actuated while the second-counting stage remains cleared thereby to bring all the counting stages of said time-counting circuit back into the original condition for normal time-counting operation.

3,988,887

FUEL CONTROL SYSTEM FOR GAS TURBINE ENGINE

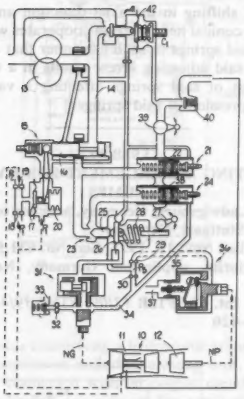
Geoffrey Arthur Lewis, Solihull, England, assignor to Lucas Industries Limited, Birmingham, England

Filed June 10, 1975, Ser. No. 585,683

Claims priority, application United Kingdom, July 18, 1974, 31987/74

Int. Cl.² F02C *9/08, 9/10*

U.S. Cl. 60—39.16 R **10 Claims**



1. A fuel control system for a gas turbine engine which includes a gas generator turbine and a separate work turbine, comprising a variable fuel metering device, means responsive to the pressure difference across the gas generator compressor for causing said metering device to vary the fuel flow therethrough, a first throttle valve having an inlet communicating with the outlet of said metering device and an outlet through which fuel can flow to the engine, said first throttle valve including means responsive to an increase in the pressure drop across said metering device for causing said first throttle valve to reduce fuel flow therethrough, a second throttle valve having an inlet and an outlet respectively communicating with the inlet and outlet of said first throttle valve, said second throttle valve including means responsive to an increase in desired engine speed, to an increase in the pressure downstream of said metering device and to an increase in a servo pressure signal for causing said second throttle valve to increase fuel flow therethrough, and a first governor means responsive to the speed of the gas generator turbine for deriving said servo pressure signal from the pressure upstream of said metering device, an increase in said turbine speed acting to reduce said servo pressure signal.

3,988,888

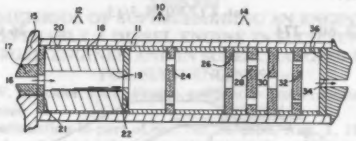
FILTER/COOLER

Michael D. Jacobson, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 14, 1974, Ser. No. 480,188

Int. Cl.² F03H *5/00;* **F23R** *1/00*

U.S. Cl. 60—204 **9 Claims**



1. For use in conditioning hot gases bled from a rocket chamber,

a filter cooler comprising:

a housing;

a hollow block of solid material in said housing acting as a conduit for said gases and endothermically reacting therewith;

said hollow block consisting of a solidified mixture of 84 to 90% decomposable chemical coolant and 10 to 16% plastic binder;

a plurality of filter elements in said housing collectively providing a tortuous path for conduit of said gases after passage through said hollow blocks; and

a wire mesh filter element in the path of said gases after passage through said filter elements providing said tortuous path.

3,988,889

COWLING ARRANGEMENT FOR A TURBOFAN ENGINE

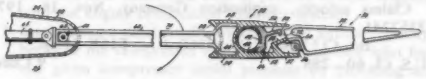
Anthony Joseph Chamay, Marblehead; James Smith, Topsfield, and Thomas Neil Hull, Jr., Marblehead, all of Mass., assignors to General Electric Company, Lynn, Mass.

Filed Feb. 25, 1974, Ser. No. 445,459

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² F02K *3/02;* **B64C** *15/06*

U.S. Cl. 60—226 A **9 Claims**



1. A fan cowling for a gas turbofan engine said cowling being spaced apart from a core engine to define an annular bypass duct therebetween and comprising:

a forward fixed portion;

an aft variable portion including a unison ring in axial alignment with the fixed portion;

a plurality of circumferentially spaced apart nozzle flaps disposed to be freely rotatable between limit stops around the aft end of the unison ring such that the differential air pressure existing between the bypass duct airflow and the ambient causes the nozzle flaps to rotate radially outward to a maximum nozzle area position;

an inflatable bladder in engagement with the unison ring; and

actuating ring means translatably disposed relative to the unison ring between the bladder and nozzle flaps for translating downstream to engage and rotate the nozzle flaps radially inward upon inflation of the bladder to thereby decrease the exhaust area of the bypass duct and prevent the nozzle flaps from being rotated further radially outward by said differential air pressure.

3,988,890
OVERHEATING PROTECTION FOR AN EXHAUST GAS PURIFICATION BLOCK

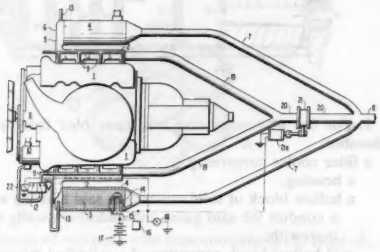
Jorg Abthoff, Pluderhausen; Dag-Harald Huttebraucker, Endersbach, and Gunter Loose, Kemnat, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Mar. 3, 1975, Ser. No. 554,689

Claims priority, application Germany, Mar. 5, 1974, 2410417

Int. Cl.² F01N *3/15*

U.S. Cl. 60—274 **26 Claims**



1. A method for preventing an overheating of an exhaust gas purification block for internal combustion engines in case of a high proportion in combustible gas components in the exhaust gases, in which the exhaust gases are conducted past the exhaust gas purification block by way of a controllable by-pass line, comprising the step of blowing-in air at least during the opening periods of the by-pass line into a line leading to the exhaust gas purification block, the air is blown into the line leading to the exhaust gas purification block in the form of at least one air jet directed opposite the normal exhaust gas flow through said line, and the air jet passes transversely over the inlet opening of the exhaust gas purification block.

3,988,891
POSITIONING ARRANGEMENT HAVING A DRIVE MOTOR

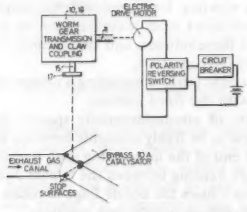
Alfred Hoyler, Buhlertal, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Nov. 11, 1974, Ser. No. 522,943

Claims priority, application Germany, Nov. 16, 1973, 2357241

Int. Cl.² F01N *3/15*; F16D *3/14*; F16K *31/44*

U.S. Cl. 60—288 **9 Claims**



1. In combination with a controlled member movable between two end positions defined by restrictive first and second stops, particularly a flap-type valve member loccated in the exhaust-gas conduit of an internal combustion engine and movable between first and second end positions in which the valve member comes into abutment with respective first and second seating surfaces of the conduit, an arrangement for positioning said controlled member comprising:

a. a driven motor having a motor shaft, a worm screw connected to and driven by said motor shaft, a worm gear meshing with, and driven by, said worm screw and provided on one axial end face thereof with a groove extending circumferentially relative to its rotation axis;

b. a positioning arrangement output shaft coupled to and driving said controlled member, a claw coupling having a first part coupled to and driving said output shaft and a second part coupled to and driven by said worm gear;

c. means automatically operative for turning off said drive motor when said controlled member is moved into one of said end positions;

d. a pair of oppositely acting damping helical springs disposed in said groove under pre-compression intermediate said two parts of said claw coupling, each of said springs being arranged on one of the opposite sides of at least one claw of said first part of said claw coupling and being supported by respective shoulder surfaces provided on said worm gear, both of said springs being operative upon drive-motor turn-off for absorbing the kinetic energy present in the moving parts of the positioning arrangement to effect braking of such moving parts and so dimensioned as not to be deformed during such absorbing beyond a predetermined maximum possible extent; and

e. an adjusting screw having a conical head, said screw being threaded into the body of said worm gear for screw threaded shifting in the axial direction and so disposed that said conical head portion cooperates with one end of one of said springs in such a manner that axial displacement of said adjusting screw results in a transverse displacement of said springs effecting a variation in the pre-compression of said springs.

3,988,892
REGULATING ARRANGEMENT FOR HYDRAULIC PUMPS

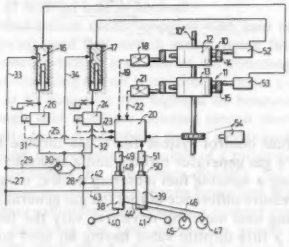
Paul Bosch, Ludwigsburg, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Nov. 13, 1975, Ser. No. 631,516

Claims priority, application Germany, Nov. 19, 1974, 2454732

Int. Cl.² F15B *13/09*; F16H *39/46*

U.S. Cl. 60—420 **11 Claims**



1. An hydraulic system, comprising, in combination, a common drive machine; a plurality of adjustable-volume pumps driven by the common drive machine and each having a respective volume-adjustment means; a plurality of hydraulic consumers each receiving fluid from and driven by a respective one of the adjustable-volume pumps; a plurality of control valves individually settable by the user of the hydraulic system, each located in the fluid path leading from a respective one of the pumps to a respective one of the consumers; a plurality of pressure regulators, each associated with and regulating the output of a respective one of the adjustable-volume pumps by automatically adjusting the setting of the respective volume-adjustment means; a plurality of first transducers operative for generating first signals indicative of the settings of respective ones of the volume-adjustment means; a

plurality of second transducers operative for generating second signals indicative of the settings of respective ones of the control valves; and control means operative for maintaining the settings of the volume-adjustment means in correspondence with the settings of the control valves by automatically altering the operation of the pressure regulators in response to discrepancies between the settings indicated by the first and second signals.

3,988,893

HYDROSTATIC TRANSMISSION DRIVE SYSTEM

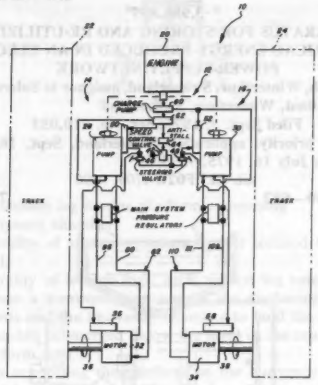
Edward J. Bojas, and Harold R. Ward, both of Marshall, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 248,685, April 28, 1972, Pat. No. 3,795,109. This application Sept. 26, 1973, Ser. No. 400,871

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² F16D *31/02*

U.S. Cl. 60—445 **32 Claims**



1. An apparatus comprising a hydrostatic transmission, said hydrostatic transmission including a pump unit, a motor unit adapted to be connected with an output member, and first conduit means having one passage for conducting relatively high pressure fluid from said pump unit to said motor unit and another passage for conducting relatively low pressure fluid from said motor unit to said pump unit, charge pump means for supplying fluid to said hydrostatic transmission, actuator means for varying the effective displacement of at least one of said units of said hydrostatic transmission to vary the speed at which the output member is driven by said motor unit, said actuator means including pressure responsive motor means for effecting a variation in the displacement of said one unit in response to a variation in control fluid pressure, second conduit means for conducting control fluid pressure to said motor means, pressure controller means for varying the control fluid pressure conducted to said motor means to vary the speed at which the output member is driven by said first motor unit, said pressure controller means being operable from a neutral setting in which said motor unit is substantially ineffective to drive the output member to any one of a plurality of operating settings in each of which said pressure controller means is effective to port a different fluid pressure to said motor means, and control means for varying the control fluid pressure ported to said motor means in response to a decrease in the fluid pressure output of said charge pump means while maintaining the setting of said pressure controller means substantially constant to effect a reduction in the speed at which said output member is driven, said control means including pressure responsive valve means for decreasing the relatively high fluid pressure in said one passage in response to a decrease in the charge pressure during operation of said hydrostatic transmission, said valve means including a valve operable from a closed condition to an open condition enabling relatively high pressure fluid to flow from said one passage and means for effecting operation of said valve from the closed condition to the open condition in response to a decrease in the charge pressure.

3,988,894

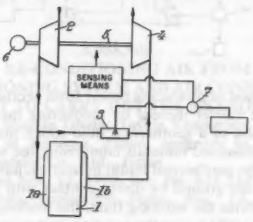
METHODS OF SUPERCHARGING AN ENGINE, PREFERABLY A DIESEL ENGINE IN SUCH SUPERCHARGED ENGINES, AND IN SUPERCHARGING UNITS FOR SUCH ENGINES

Jean F. Melchior, Paris, France, assignor to Etat Francais Paris, France

Continuation-in-part of Ser. No. 384,566, Aug. 1, 1973, abandoned, which is a continuation of Ser. No. 139,080, April 30, 1971, abandoned, and a continuation-in-part of Ser. No. 345,968, March 29, 1973, abandoned. This application Jan. 29, 1974, Ser. No. 437,748

Int. Cl.² F02B *33/40, 33/44*

U.S. Cl. 60—606 **34 Claims**



1. A method of supercharging an internal combustion engine of the expansible chamber type having a turbo-compressor system with at least one compressor and at least one turbine for driving the compressor, said engine having a combustion chamber system connected between the outlet of said compressor and the inlet of said turbine having an airflow capacity which varies as a function of engine r.p.m. and load, said method comprising the steps of:

a. directly communicating the outlet of said compressor with the turbine inlet by connecting a bypass passageway between said outlet and inlet in parallel airflow relation with the engine combustion chamber system;

b. establishing a substantially constant total airflow capacity between the compressor outlet and the turbine inlet for any given compressor outlet pressure by providing an airflow capacity in said bypass passageway adequate to automatically responsively compensate for the variations in the airflow capacity of the engine combustion chamber system caused by engine r.p.m. and load variations whereby the pressure difference, if any, between the compressor outlet and turbine inlet is generally independent of the ratio of the flow rate of the air traversing said bypass passageway to the total airflow delivered from said compressor;

c. matching said turbo-compressor system to the total airflow capacity of said engine combustion chamber system and of said bypass passageway such that the plot of the ratio of the compressor output pressure to the compressor input pressure versus the airflow delivered by the compressor, during self-sustaining operation of said turbo-compressor system and conjoint operation of the engine under its own power in response to any variation in engine load and r.p.m. within the complete operating range of the engine, lies at least within a narrow area approximating a predetermined curve located in a high yield area generally near to, but which does not exceed, the surge line characteristic of the compressor; and

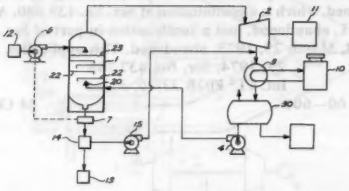
d. operating the engine under its own power and simultaneously operating the turbo-compressor system in a self-sustaining mode so as to deliver air from said compressor to said engine combustion chamber system and to said bypass passageway such that the aforementioned plot of the matched turbo-compressor lies within said narrow area.

3,988,895

POWER GENERATION FROM HOT BRINES

Itzhak Sheinbaum, Country Club Drive, Burbank, Calif. 91501

Filed Jan. 11, 1974, Ser. No. 432,482
Int. Cl.² F03G 7/00; F01K 25/08
U.S. Cl. 60—641 **11 Claims**



1. A method of producing power from geothermal heat with fluid as the carrier thereof by recovering the heat from the liquid portion of a geothermal fluid which may contain salts and other dissolved minerals comprising the steps of:

passing the geothermal liquid in heat exchange relationship above the ground by direct contact with a working fluid to vaporize the working fluid, the working fluid having a boiling point below the input temperature of the geothermal fluid; and

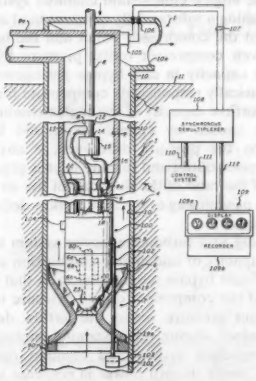
expanding resulting vaporized fluid in a power extracting gas expansion device.

3,988,896

GEOTHERMAL ENERGY PUMP AND MONITOR SYSTEM

Hugh B. Matthews, Acton, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed May 23, 1975, Ser. No. 580,384
Int. Cl.² F03G 7/00
U.S. Cl. 60—641 **27 Claims**



1. In geothermal deep well pumping apparatus located at a subterranean source of geothermal well fluid of the kind including geothermal energy exchange means for providing a working fluid and pump means driven by motor means responsive to said working fluid for pumping said geothermal fluid always in liquid state for flow in cooperative energy exchange relation with respect to said geothermal exchange means toward the earth's surface:

conduit means for passing said working fluid after yielding energy to said motor means as exhaust fluid to the earth's surface,

alternator means supported within said conduit means comprising alternator rotor means and alternator stator means,

said alternator rotor means being supported solely by the rotor of said motor means,

said alternator stator means being supported in cooperative relation about said alternator rotor means from said conduit means,

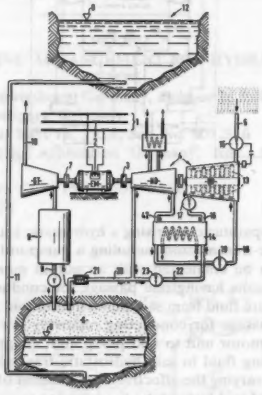
said alternator stator means and said alternator rotor means being so cooperatively disposed that the space therebetween is occupied by a portion of said exhaust fluid.

3,988,897

APPARATUS FOR STORING AND RE-UTILIZING ELECTRICAL ENERGY PRODUCED IN AN ELECTRIC POWER-SUPPLY NETWORK

Rene Strub, Winterthur, Switzerland, assignor to Sulzer Brothers, Limited, Winterthur, Switzerland

Filed Sept. 3, 1975, Ser. No. 610,055
Claims priority, application Switzerland, Sept. 16, 1974, 12561/74; July 16, 1975, 9295/75
Int. Cl.² F02C 1/04, 9/00
U.S. Cl. 60—682 **7 Claims**



1. An apparatus for storing energy produced in an electric power-supply network and for re-utilizing the stored energy during peak loads of said network, said apparatus comprising

a compressor group including at least two multistage turbo-compressors connected in series;

a compressed-air storage chamber for receiving compressed air from said compressor group;

an electric machine connected to said compressor group and to said network to function as a motor for driving said compressor group to deliver compressed air to said storage chamber;

a gas turbine selectively coupled to said electric machine and to said storage chamber for driving said electric machine as a generator during a discharge of air from said storage chamber to supply electric energy to said network;

a cooler connected in series between said two turbo-compressors for cooling a flow of compressed air therebetween;

a first conduit connected to an output of the lowest-pressure turbo-compressor of said compressor group and to said cooler to deliver compressed air thereto;

a second conduit connected between said cooler and an input of said lowest-pressure turbo-compressor to deliver the air pumped from said output of said lowest-pressure turbo-compressor to said input thereof; and

a throttling means in said first conduit.

3,988,898

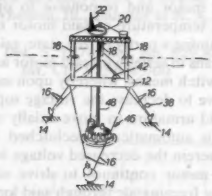
PIPELINES AND MARINE PLATFORMS

Ronald D. McDonald, N. Vancouver, Canada, assignor to Intercontinental Marine Development Ltd. and The Laird Group Limited, both of, England

Filed Dec. 26, 1974, Ser. No. 536,657

Int. Cl.² B63B *21/00;* **E21B** *17/00*

U.S. Cl. 61—98 **3 Claims**



1. A tension leg marine platform comprising

a buoyancy chamber,

a plurality of anchoring arrangements secured to the sea bed,

a plurality of tension legs, each tension leg extending between a corresponding one of the anchoring arrangements and the buoyancy chamber to hold the buoyancy chamber submerged below the level of the sea,

a platform, and

means supporting the platform on the buoyancy chamber but above the level of the sea,

each anchoring arrangement for each leg comprising a pile driven into the sea bed, an air filled working chamber mounted on the pile and defining an orifice through which a said leg can extend into the chamber, and clamping means secured to the chamber and housed within the chamber, the clamping means clamping the leg to the pile.

3,988,899

PILE JOINER FOR CONNECTING THE ENDS OF CONCRETE PILES AND ITS MEMBERS

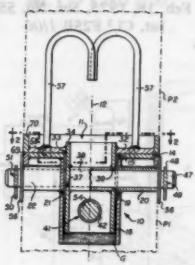
John J. Dougherty, Cedar Grove, N.J., assignor to APF Corporation, Clifton, N.J.

Filed July 1, 1975, Ser. No. 592,189

Int. Cl.² E02D *5/30;* **B25G** *3/00*

U.S. Cl. 61—53 **25 Claims**

1. A pile joining member forming a socket member or a mating member for a pile joiner for connecting together the ends of two concrete piles and each member having a tubular element comprising a base plate having a center and a hole therethrough at the center thereof, a tubular element having a cross dimension less than that of the base plate and secured to the base plate centrally thereof and extending at right angles thereto, the tubular element having ends and a cross dimension the same as or approximately the same as that of the hole in the base plate and having opposite walls, the tubular element having a cross dimension and form so as to receive the tubular element of the other member, and the wall of the tubular element having at least a first sleeve means including at least one sleeve hole through a wall thereof and a straight sleeve, said sleeve hole having a dimension and spaced from the base plate and between the ends of the element, said sleeve being secured to at least one wall of the tubular element at a sleeve hole and extending in one direction either outwardly or inwardly from the wall and at right angles thereto,



and said sleeve having an outer cross dimension and an inner cross dimension one of which is the same as the dimension of the sleeve hole.

3,988,900

METHOD OF RE-CONDITIONING AIR FROM CENTRAL AIR CONDITIONING SYSTEM AND AIR CONDITIONING UNIT TO CARRY OUT THE METHOD

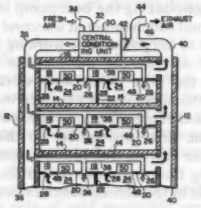
Jyoji Kamata; Makoto Obata; Toshio Yamamoto, and Shigeo Murase, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Nov. 12, 1975, Ser. No. 631,312

Claims priority, application Japan, Nov. 13, 1974, 49-137990[U]

Int. Cl.² F25D *17/06;* **F24F** *13/00*

U.S. Cl. 62—92 **18 Claims**



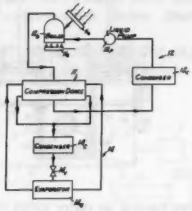
1. A method of re-conditioning air supplied by a central air conditioning system and circulated through a space to be air conditioned in a building having a ceiling chamber over said space, comprising (1) producing a continuous stream of a refrigerant through a closed loop having cycles to evaporate and condense said refrigerant, (2) withdrawing out of said space into said ceiling chamber the air which has been circulated through said space, (3) inducing a first forced circulation of air within said ceiling chamber, (4) exchanging heat between said circulation of air and said stream of the refrigerant, (5) inducing a second forced circulation of air out of said space and back into the space separately of said first forced circulation of air, (6) exchanging heat between said second forced circulation of air and the stream of the refrigerant which has exchanged heat with said first forced circulation of air, (7) collecting water condensate produced by the evaporation of said refrigerant, (8) bringing the collected water condensate into heat-conductive contact with the heat resulting from the condensation of said refrigerant for vaporizing the water condensate in said ceiling chamber and (9) withdrawing the resultant water vapor out of said ceiling chamber by means of said first forced circulation of air.

3,988,901

DUAL LOOP HEAT PUMP SYSTEM

Samuel V. Shelton, Stone Mountain, and Glen P. Robinson, Jr., Atlanta, both of Ga., assignors to Scientific-Atlanta, Inc., Atlanta, Ga.

Filed Feb. 18, 1975, Ser. No. 550,413
Int. Cl.[2] F25B *1/00*
U.S. Cl. 62—116 18 Claims



1. A method of operating a dual loop heat pump system with an expansion-compression device with a linearly movable operating free piston assembly slidably carried in a chamber for linear movement in the chamber along a prescribed path, the free piston dividing the chamber into a first subchamber of varying size as the free piston assembly moves along the prescribed path and a second subchamber of varying size as the free piston assembly moves along the prescribed path, a Rankine cycle power loop driving the expansion-compression device, and a vapor compression heat pump loop driven by the expansion-compression device comprising the steps of:

a. selectively introducing the power loop working fluid into the first subchamber at a first pressure to move the free piston assembly toward the second subchamber linearly and induce kinetic energy in the free piston assembly; and,

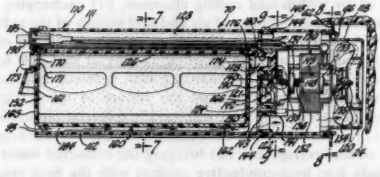
b. selectively introducing the heat pump loop working fluid into the second subchamber at a second pressure prior to introduction of the power loop working fluid into the first subchamber so that the moving free piston assembly compresses the heat pump loop working fluid in the second subchamber, step a) further including adjusting the time period of introduction of the power loop working fluid into the first subchamber so that kinetic energy induced in the moving free piston assembly by the power loop working fluid is transferred to the heat pump loop working fluid in the second subchamber as work of compression.

3,988,902

REFRIGERATOR WITH ADD-ON ICE CREAM MAKER

James W. Jacobs, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 28, 1975, Ser. No. 635,886
Int. Cl.[2] A23G *9/00*
U.S. Cl. 62—136 4 Claims



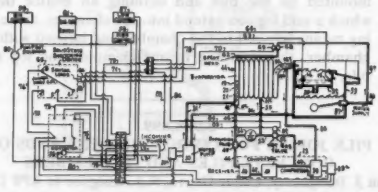
1. A frozen confection-making appliance for use in the freezer compartment of a refrigerator cabinet, said appliance including a housing having a front freezing chamber and a rear machinery compartment, a front opening providing access to said chamber, a container for holding the confection to be congealed adapted for removable reception in said chamber, confection mixing means supported in said container, an electric motor disposed within said machinery compartment, said motor including an armature having first and second drive shaft portions, said armature movable axially responsive to variations in voltage supplied to said motor, said first shaft portion adapted to be connected to said mixing means by drive train means, means for declutching said first shaft portion from said mixing means, said second shaft portion being connected to fan means in said machinery compartment, longitudinally extending air passage means in heat exchange relation with said tray providing communication between freezing chamber air inlet means and said machinery compartment, said fan means operative for drawing freezer air through said air passage means and said machinery compartment for return to the refrigerator cabinet, a control circuit for said appliance comprising thermal switch means in series connection with said motor and responsive to open by sensing a predetermined temperature of said motor resulting from the confection attaining a partly frozen state, said circuit connecting resistor means in series with said motor and in parallel with said thermal switch means, whereby upon said thermal switch means operative to decrease the voltage supplied to said motor causing said armature to move axially whereby said first shaft portion is automatically declutched from said mixing means, and wherein the decreased voltage being of a quantity whereby said motor continues to drive said fan means to circulate below freezing air through said longitudinal passage and said machinery compartment for final freezing of the confection.

3,988,903

DUAL ACTING DEFROST SYSTEM FOR ICE MAKERS AND CONTROLS THEREFOR

Jimmy Milton Brewer, Fort Smith, and John Thomas Tindle, Van Buren, both of Ark., assignors to Refrigerated Products, Inc., Fort Smith, Ark.

Filed Mar. 14, 1975, Ser. No. 558,365
Int. Cl.[2] F25C *1/12*
U.S. Cl. 62—138 9 Claims



1. In an ice making machine having alternate freezing and defrost cycles and provided with an elongated evaporator (14) consisting of inner and outer tubes (20, 19); means connecting the opposite ends (16, 16a) of said outer tube (19) to the opposite ends of a segment of said inner tube (20) to form a sealed annular chamber (21) between the tubes, the opposite ends of said chamber having inlet and outlet ports (11a, 11b) communicating therewith respectively; pump means for flowing pressurized water through said inner tube (20) during the freezing cycle; and means (39, 46, 36) operable concurrently with said last-named means for flowing a refrigerant fluid through said chamber (21) to bond and form a hollow ice column (22) of progressively increasing thickness upon the inside surface of said inner tube segment, a dual acting defrost system comprising:

means (39, 51, 52) operable upon formation of said ice column (22) to a predetermined wall thickness and during said defrost cycle for flowing a defrost fluid downstream through said chamber (21) in heat exchange with

said inner tube (20) to progressively thaw said ice column bond in the same direction, said defrost fluid progressively replacing the refrigerant fluid remaining in the chamber from said freezing cycle, and

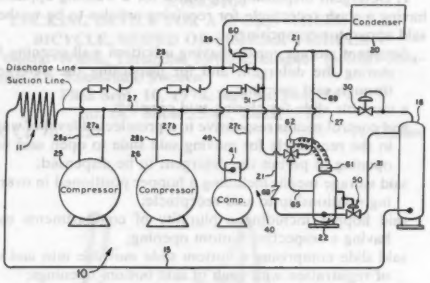
means (68, 69, 62) operable concurrently with said last-named means (39, 51, 52) for continuously flowing a second defrost fluid over said outer tube (19) and in heat exchange with said refrigerant fluid from the freezing cycle being replaced and with the replacing defrost fluid to elevate the temperatures of the two last-named fluids, thereby decreasing the work load of said first defrost fluid and reducing the length of the defrost cycle said second defrost fluid being a relatively warm liquid and said means for flowing said second defrost fluid includes a spray head for distributing said liquid over the entire perimeter and length of said evaporator outer tube.

3,988,904

REFRIGERATION SYSTEM

Robert R. Ross, Wheaton, Ill., assignor to H. A. Phillips & Co., St. Charles, Ill.

Filed Dec. 5, 1974, Ser. No. 529,856
Int. Cl.² F25B 45/00
U.S. Cl. 62—174 **3 Claims**



1. A refrigeration system, comprising:

a. compressor means for compressing vaporized refrigerant received from evaporator means,

b. condensor means for receiving compressed refrigerant gas from said compressor means and removing heat from said gas to liquify all or a portion of it.

c. receiver tank means for receiving said liquified refrigerant from said condensor means and delivering it to said evaporator means at a predetermined system pressure,

d. the pressure in said condensor means normally being above said predetermined pressure and being effective then to force liquid refrigerant into said receiver tank means,

e. pressure means actuated when said condensor pressure falls to about or below said predetermined system pressure and effective, when actuated, to force liquified refrigerant from said condensor means into said receiver tank means,

f. said pressure means comprising a compressor which functions solely to compress vaporized refrigerant for delivery to said condensor means while the pressure in said condensor means is approximately at or above said predetermined pressure, and

g. a pilot receiver tank provided between said condensor means and said receiver tank means for collecting liquid refrigerant enroute to said receiver tank means,

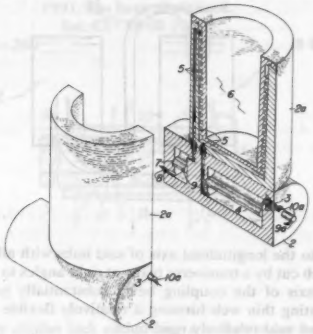
h. condensed refrigerant accumulating in said pilot receiver tank means to a higher liquid level than normal when the pressure in said condensor means falls approximately to or below said predetermined pressure whereupon a valve in said system is actuated to cause refrigerant gas under pressure to be directed from said compressor into said pilot receiver tank to force liquid accumulated therein into said receiver tank means.

3,988,905

REVERSIBLE MECHANICAL-THERMAL ENERGY CELL

Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752

Filed Sept. 24, 1975, Ser. No. 616,336
Int. Cl.² F25D 9/00
U.S. Cl. 62—401 **22 Claims**



1. A reversible mechanical-thermal energy cell comprising:

a. a reversible rotary intake volumetric displacement device, said intake volumetric displacements significantly vanishing at least once each revolution;

b. a reversible rotary exhaust volumetric displacement device, said exhaust volumetric displacements significantly vanishing at least once each revolution, with the rate of said exhaust volumetric displacements being unequal to the rate of said intake volumetric displacements, said rotary intake and exhaust devices being rotatably connected;

c. a reversible intake passage leading to the reappearing volumetric displacement side of said reversible rotary intake volumetric displacement device;

d. a reversible exhaust passage leading from the vanishing volumetric displacement side of said reversible rotary exhaust volumetric displacement device;

e. a thermal energy reservoir for containing matter subject to a thermal change;

f. a reversible compression-expansion conduit leading from the vanishing side of said reversible rotary intake volumetric displacement device to the reappearing side of said reversible rotary exhaust volumetric displacement device, said conduit in thermal communication with said thermal energy reservoir and said matter subject to a thermal change; and

g. a compressible-expandible fluid subjected to volumetric, pressure and thermal change in said reversible conduit, said fluid being volumetrically displaced from said intake passage to said conduit via the rotary intake volumetric displacements and from said conduit to said exhaust passage via the rotary exhaust volumetric displacements, and said fluid undergoing a change in energy characteristics in said reversible mechanical-thermal energy cell.

3,988,906

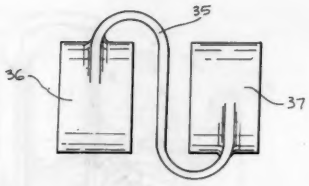
FLEXIBLE COUPLING

Thomas R. Smith, 710 W. 11th St. South, Newton, Iowa 50208

Filed Aug. 1, 1975, Ser. No. 601,099
Int. Cl.² F16D 3/52
U.S. Cl. 64—12 **7 Claims**

1. A unitary one piece flexible coupling for transmitting rotational torque comprising: a relatively rigid drive hub connectable to a driving member; a relatively rigid driven hub connectable to a driven member; and at least one relatively

thin web formed of the same material as said hubs integrally with and thereby joining said driven hub to said driven hub and including at least one undulation in said web, said web having an axis of curvature extending substantially at a right



angle to the longitudinal axis of said hubs with all sections of the web cut by a transverse plane at right angles to the longitudinal axis of the coupling being substantially parallel, said undulating thin web forming a relatively flexible connection between said relatively rigid hubs.

3,988,907

FLEXIBLE TORQUE-TRANSMITTING ELEMENT FOR COUPLINGS AND COUPLINGS INCLUDING SUCH ELEMENTS

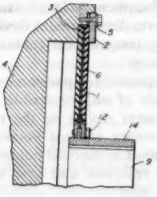
Heinz-Dieter Bohm, Unna; Christian Brieseck, Dortmund, and Werner Ruggen, Holzwickede, all of Germany, assignors to Maschinenfabrik Stromag G.m.b.H., Unna, Germany

Filed Mar. 21, 1975, Ser. No. 560,443

Claims priority, application Germany, Apr. 2, 1974, 2415911

Int. Cl.² F16D *3/78*

U.S. Cl. 64—13 **15 Claims**



1. A flexible coupling including a flexible torque-transmitting element for trying the driven member of the coupling to the driving member thereof including

a. a body of flexible material having a rim zone;

b. a fabric insert in said body of flexible material;

c. said fabric insert having a portion projecting radially outwardly beyond said rim zone of said body of flexible material and forming a clamping zone situated outside said body of flexible material; and

d. joint means for applying clamping pressure upon said body of flexible material at said rim zone thereof and upon said clamping zone of said fabric insert adapted to apply higher pressures upon said clamping zone of fabric insert than upon said body of flexible material at said rim zone thereof.

3,988,908

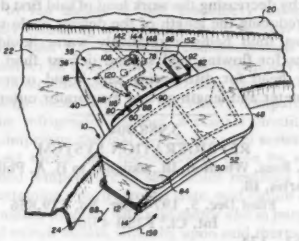
DETERGENT DISPENSING APPARATUS FOR WASHING MACHINE

Robert Beare; Willis Harlow, both of Herrin, and Robert L. Spurgeon, West Frankfurt, all of Ill., assignors to Fedders Corporation, Edison, N.J.

Filed July 24, 1975, Ser. No. 598,552

Int. Cl.² D06F *39/02*

U.S. Cl. 68—12 R **19 Claims**



1. Detergent dispensing apparatus for a washing appliance having a wash receptacle for receiving articles to be washed, said apparatus comprising:

detergent storage means having a bottom wall opening for storing the detergent and for dispensing the detergent through said opening;

a movable slide for closing said opening;

and control means responsive to a preselected level of water in the receptacle for moving said slide to open said wall opening to permit the detergent to be dispensed;

said storage means including a hopper positioned in overlying relationship to said receptacle;

said hopper including a plurality of compartments each having a respective bottom opening;

said slide comprising a bottom slide movable into and out of registration with each of said bottom openings;

and said control means comprising stepping means for sequentially moving said slide out of registration with said bottom openings each time the water level reaches said preselected level.

3,988,909

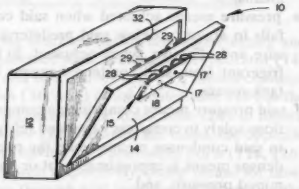
SAFETY DRUG CABINET

Joseph V. Catapano, 30 Longfellow Drive, Huntington Station, N.Y. 11746

Filed Oct. 25, 1974, Ser. No. 517,898

Int. Cl.² B65D *55/14*; E05B *65/52*

U.S. Cl. 70—63 **2 Claims**



1. A safety drug cabinet comprising a housing having top, bottom, rear and side walls and an open front, a door hingedly secured to said bottom wall for closing said opening said door having a front face and a rear face and combination lock means for locking said door in closed position, said combination lock means comprising a front bracket secured to said front face, a rear bracket secured to said rear face, a plurality of rotatable shafts extending through said door and said rear bracket, a latch having a round portion and a flat portion, said

latch being secured to one end of each of said shafts behind said rear bracket, a disk secured to the other end of each of said shafts, said top wall having a downwardly extending flange, said latching member being operable by rotating said shaft to engage the round portion with said flange, whereby said door will be in locked position and to disengage said latch from said flange to place the door in an unlocked position, each of said disks being inscribed with marks dividing the disk into three segments, a cover plate secured to said front bracket positioned to obscure two of said segments while exposing the third of said segments, each of said third segments being aligned with each said flat portion of said latch and having markings indicating an open position of said combination lock, when said wheel segments are exposed, a plurality of pressure-sensitive adhesive disks secured to toothed wheels, said disks having three segments marked thereon, one of each of said disk segments bearing a predetermined marking corresponding to a respective segment marking on said toothed wheel indicating an open position of said latch, and resilient detent strips secured to said bracket and engaging with said toothed wheels for retaining said wheels in a desired position.

3,988,910

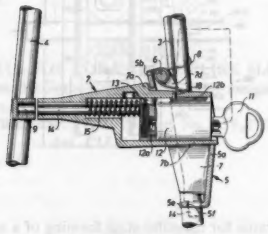
LOCKING DEVICE FOR A SPOKE WHEEL OF A BICYCLE, MOPED OR SIMILAR VEHICLE

Bo Gustaf Widen, Torshalla, Sweden, assignor to GKN-Stenman AB, Eskilstuna, Sweden

Filed Sept. 10, 1974, Ser. No. 504,786

Int. Cl.² B60R *25/00;* **B62H** *5/18*

U.S. Cl. 70—227 **11 Claims**



1. A locking device for locking a spoked wheel carried in a plurality of fork prongs said locking device comprising: a housing attached to one fork prong; locking pin receiving means attached to another fork prong; a lock lever having a bore therethrough and being pivotally attached to said housing by way of an axle located non-coplanar with the axis of the bore, the lock lever being movable between a release position in which the wheel is free to rotate and a locked position in which the lock lever is in line with said locking pin receiving means, a locking pin movably mounted within the lock lever such that it may be moved to protrude from one end of the bore extending through the lock lever to engage said locking pin receiving means; a lock member mounted in the lock lever and engaging the locking pin so as to move the locking pin into and out of engagement with the locking pin receiving means, wherein the lock member is lockable by means of a key insertable into the lock member in a direction parallel to the axis of the locking pin, and at least three surfaces on the lock lever which are closely adjacent to corresponding surfaces on the locking pin receiving means and the housing such that at least one of the surfaces contacts its corresponding surface to retain the lock lever in its locked position upon removal of the axle.

3,988,911

CYLINDER LOCK

Paul Lipschutz, Croissy sur Seine, France, assignor to Societe d'Exploitation des Brevets Neiman, Courbevoie, France

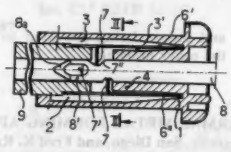
Continuation-in-part of Ser. No. 361,109, May 17, 1973. This application May 21, 1974, Ser. No. 472,022

Claims priority, application France, May 22, 1973, 73.18510

The portion of the term of this patent subsequent to Dec. 24, 1991, has been disclaimed.

Int. Cl.² E05B *29/00*

U.S. Cl. 70—362 **8 Claims**



1. A safety clinder lock comprising a hollow stator body, a key-responsive inner cylindrical rotor member mounted within said stator body and rotatable by a removable key formed with notches and insertable into said rotor member, and key-operated locking means carried by said rotor member, said stator body comprising an outer cylindrical casing portion and an inner substantially cylindrical core portion at least partially co-extensive with and in coaxial relationship to said outer casing portion to leave therebetween an intermediate annular space into which at least one portion of said rotor member extends, an outer surface of said inner core portion being formed with a number of circumferentially spaced, longitudinally extending grooves; said locking means comprising an assembly of circumferentially spaced, elongated elements secured at one end to said rotor member and extending longitudinally of the lock, said elements being disposable with clearance in said annular intermediate space to be rotatable therein; resilient biasing means urging said elongated elements radially inwardly into said grooves of said inner core portion to hold said rotor member against rotation and being shiftable, against the action of said biasing means upon the insertion of a correctly coded key, radially outwardly to be disposed within said intermediate annular space and thus to allow free rotation of said rotor member, each elongated element being formed with a radially inwardly projecting catch element engageable with said key in the fully inserted position of the latter, wherein the improvement consists in that each elongated element comprises a rigid lever pivoted at one end for movement in a generally radial plane and wherein said biasing means comprises an elastic ring extending around the assembly of said levers to urge these levers towards their radially inward positions.

3,988,912

LOCKING DEVICES

Wilfrid David Rogers, Solihull, England, assignor to Wilmot-Breeden Ltd., Birmingham, England

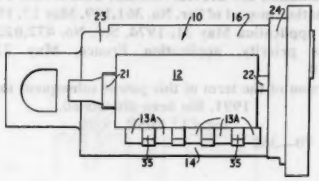
Filed Mar. 10, 1976, Ser. No. 665,565

Int. Cl.² E05B *9/04*

U.S. Cl. 70—364 R **6 Claims**

1. In a plug for a locking device intended, in use, to be turned by means of the appropriate key within a cylinder, the plug having tumblers which normally project therefrom for engagement with the cylinder to prevent rotation of the plug relative to the cylinder but are retracted into the key plug by the key upon insertion of the key, the improvement which comprises forming the plug as an outer housing and an inner

matrix, the outer housing having slots to receive springs which act on the tumblers, the inner matrix having slots to receive



the tumblers and means being provided to lock the inner matrix within the outer housing.

3,988,913

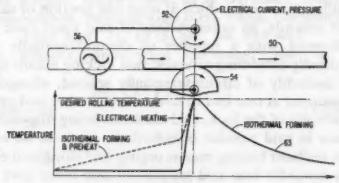
ISOTHERMAL METAL FORMING APPARATUS

Arthur G. Metcalfe, San Diego, and Fred K. Rose, Chula Vista, both of Calif., assignors to International Harvester Company, San Diego, Calif.

Division of Ser. No. 484,307, June 28, 1974, Pat. No. 3,944,782, which is a continuation-in-part of Ser. No. 227,683, Feb. 18, 1972, Pat. No. 3,823,299, and Ser. No. 426,564, Dec. 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 226,570, Feb. 16, 1972, abandoned, said Ser. No. 227,683, and said Ser. No. 226,570, each is a division of Ser. No. 856,526, Sept. 8, 1969, Pat. No. 3,644,698. This application Feb. 28, 1975, Ser. No. 553,998

Int. Cl.[2] B21B *27/10*; B21D *37/16*; B21H *1/06*

U.S. Cl. 72—69 **22 Claims**



1. Apparatus for the solid state forming of a metallic workpiece into a component of selected configuration, comprising: a rotatable, pressure applying electrode fabricated of a refractory metal; means disposed in spaced relation to said electrode for supporting the workpiece; means supporting said electrode for movement toward and away from said workpiece supporting means; means operable to so bias said electrode toward said workpiece supporting means that it exerts a force of selected magnitude on said workpiece; means for heating both said workpiece in that region thereof between the pressure applying electrode and the workpiece supporting means and that portion of the electrode contiguous to the workpiece and for impeding the flow of heat away from said heated portion of said electrode to keep said electrode from chilling said workpiece comprising means for connecting the workpiece across an electrical power source through the pressure applying electrode and the workpiece supporting means; means for so regulating the current density through the workpiece and the force exerted on it by the rotatable pressure applying electrode as to maintain the temperature of said workpiece below its melting point but sufficiently high to produce in the heated region between the pressure applying electrode and the workpiece supporting means a localized zone in which the workpiece is in a plastic and flowable condition; means for effecting a translation of the workpiece relative to the pressure applying electrode and the workpiece supporting means to thereby cause the zone in which the plastic condition exists to proceed along the workpiece; and means including rotatable guide members disposed at intervals along the path of movement of the workpiece and on opposite sides thereof for guiding said workpiece as it is translated relative to said pressure applying electrode.

3,988,914

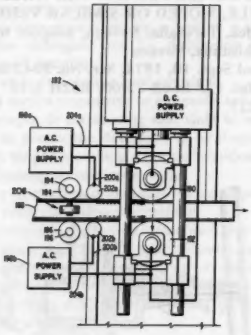
ISOTHERMAL METAL FORMING APPARATUS

Arthur G. Metcalfe, San Diego, and Fred K. Rose, Bonita, both of Calif., assignors to International Harvester Company, San Diego, Calif.

Division of Ser. No. 553,998, Feb. 28, 1975, which is a division of Ser. No. 484,307, June 28, 1974, Pat. No. 3,944,782, which is a continuation-in-part of Ser. No. 426,564, Dec. 20, 1973, abandoned, and Ser. No. 227,683, Feb. 18, 1972, Pat. No. 3,823,299, said Ser. No. 426,564 is a continuation of Ser. No. 226,570, Feb. 16, 1972, abandoned, said Ser. No. 227,683, and said Ser. No. 226,570 each is a division of Ser. No. 856,526, Sept. 8, 1969, Pat No. 3,644,698. This application Aug. 26, 1975, Ser. No. 607,788

Int. Cl.[2] B21B *27/10*; B21D *37/16*; B21H *1/06*

U.S. Cl. 72—69 **7 Claims**



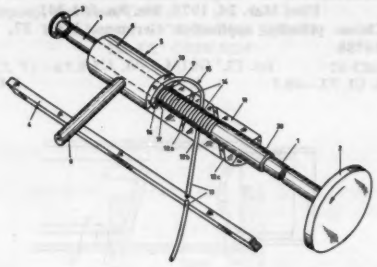
1. Apparatus for the solid state forming of a metallic workpiece into a component of selected configuration, comprising: a rotatable, pressure applying electrode; means disposed in spaced relation to said electrode for supporting the workpiece; means supporting said electrode for movement toward and away from said workpiece supporting means; means operable to so bias said electrode toward said workpiece supporting means that it exerts a force of selected magnitude on said workpiece throughout the forming operation; means for heating both said workpiece in that region thereof between the pressure applying electrode and the workpiece supporting means and that portion of the electrode contiguous to the workpiece comprising means for connecting the workpiece across an electrical power source through the pressure applying electrode and the workpiece supporting means; means for so regulating the current density through the workpiece and the force exerted on it by the rotatable pressure applying electrode as to maintain the temperature of said workpiece below its melting point but sufficiently high to produce in the heated region between the pressure applying electrode and the workpiece supporting means a localized zone in which the workpiece is in a plastic and flowable condition; means for effecting a translation of the workpiece relative to the pressure applying electrode and the workpiece supporting means to thereby cause the zone in which the plastic condition exists to proceed along the workpiece; and means for preheating said workpiece prior to the engagement of the workpiece and the pressure applying electrode.

3,988,915

METHOD AND APPARATUS FOR THE PRODUCTION OF PRESTRESSED COIL SPRINGS

Jannes Jonge Poerink, Prins Bernhardlaan, Borne, Netherlands

Filed Nov. 22, 1974, Ser. No. 526,430
Int. Cl.² B21F 3/04
U.S. Cl. 72—144 6 Claims



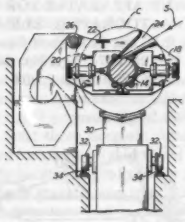
1. A method of producing prestressed coil springs by spindle coiling wherein a wire is fed to a coiling spindle and formed into spring turns around said coiling spindle with the leading end of the coils advancing along the spindle as coil turns are added wherein the fed wire is taken up or drawn in from a point behind the leading end of the coil in opposition to the direction of advance of the coils, with a predetermined spacing from the leading end of the coils and guided to a point ahead of the leading end of the coils in the form of an expanded helix.

3,988,916

APPARATUS FOR COILING STRIPLIKE MATERIAL

William Stone McGeeney, Pittsburgh, Pa., assignor to Wean United, Inc., Pittsburgh, Pa.

Filed Mar. 17, 1975, Ser. No. 559,279
Int. Cl.² B21C 47/06
U.S. Cl. 72—148 5 Claims



1. In an apparatus for guiding strip around a rotatable mandrel comprising:

a support means arranged to one side of and parallel to the axis of rotation of said mandrel,

a frame carried by said support means and arranged to extend towards said mandrel,

said support means including a first means for allowing a translational movement of said frame, and a second means for allowing a rotational movement of said frame,

strip guiding means carried by said frame arranged closely adjacent to two separate portions of said mandrel on opposite sides thereof for guiding strip therearound,

means for moving said guiding means towards and away from said mandrel,

power means operatively connected to said first means for imparting said translational movement of said frame and said guiding means as a unit relative to said mandrel, and

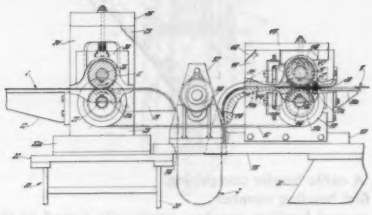
power means operatively connected to said second means for imparting said rotational movement of said frame and said guiding means as a unit relative to said mandrel.

3,988,917

APPARATUS AND METHOD FOR MAKING A CHEVRON MATRIX STRIP

Petro Mykolenko, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed June 25, 1975, Ser. No. 590,391
Int. Cl.² B21D 13/10
U.S. Cl. 72—187 5 Claims

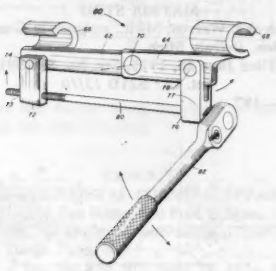


1. An apparatus for forming an indefinite length of flat strip material into a chevron matrix strip having closely spaced apart parallel fins interconnected to each other at alternating ends, each fin including diagonal first and second fin portions meeting together at an obtuse angle with one end of a fin connected by a flat crest to the next leading fin and the other end of the fin being connected by a flat valley to the next trailing fin, said flat crest and said flat valley being substantially parallel to each other, the apparatus including a frame having upright frame means in spaced apart parallel relation to each other, a pair of preforming rolls, said preforming rolls each having tooth forms on the outer periphery thereof, said preforming rolls being rotatably supported between said upright frame means with said tooth forms thereon in mating engagement with the strip material sandwiched therebetween whereby said preforming rolls will partly deform and coin the strip material into a preformed chevron strip as it passes between said preforming rolls, a pair of annularly grooved gathering rolls, each said gathering roll having complementary-shaped gathering tooth forms on the outer periphery thereon, said gathering rolls being rotatably supported by said frame means with the tooth form on one gathering roll overlapping the tooth form on the other said gathering roll, a predetermined distance, whereby to effect gathering and further forming of the strip material as it passes between said gathering rolls into a gathered over-formed chevron strip, a pair of spaced apart indexing rolls rotatably supported by said upright frame means in spaced apart relation to each other downstream of said gathering rolls in the path of travel of the strip material, a guide means fixed to said upright frame means in position to define a passage to guide said preformed chevron strip through said gathering rolls and to define a restricted throat opening on the discharge side of said gathering rolls to guide said gathered over-formed strip into the bight between said indexing rolls, each of said indexing rolls having a plurality of tooth forms separated by flat recessed spaces on the outer periphery thereof to effect proper spacing and indexing of the previously formed chevron fins on said gathered over-formed strip into said chevron strip, and drive means operatively connected to said preforming rolls, said gathering rolls and to said indexing rolls to effect rotation of said preforming rolls and rotation of said gathering rolls and said indexing rolls at predetermined speeds relative to each other.

3,988,918
CABLE BENDER

Silas Ray Crees, Eau Gallie, Fla., assignor to Manufacturing Research Corporation, Melbourne, Fla.

Division of Ser. No. 434,365, Jan. 17, 1974, Pat. No. 3,888,101. This application May 27, 1975, Ser. No. 581,035
Int. Cl.² B21D 7/00
U.S. Cl. 72—458 3 Claims

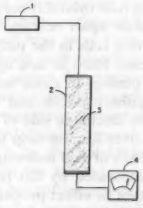


1. A cable bender comprising:
a first bending member;
a second bending member rotationally joined to the first bending member about a common pivot axis;
a lever coupled to said rotatable bending member at a point spaced from said pivot axis; and means for fixing said lever in a set position when rotational force is applied in one direction, said means further allowing said lever to rotate freely when rotational force is applied in a direction opposite to said one direction;
a first bracket pivotably mounted on said first bending member and spaced from said pivot axis;
a second bracket pivotably mounted on said second bending member and spaced from said pivot axis; and
means coupled with said lever for pulling said first and second brackets together to thereby effect rotation of at least one of said bending members about said pivot axis.

3,988,919
USE OF GRAPHITIZED CARBON BEADS FOR GAS LIQUID CHROMATOGRAPHY

Yair Talmi, and Charles B. Pollock, both of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 7, 1975, Ser. No. 620,459
Int. Cl.² G01N 31/08
U.S. Cl. 73—23.1 5 Claims

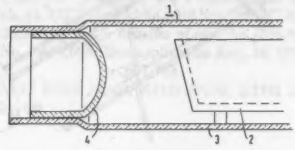


1. In an apparatus for carrying out gas chromatography comprising a packed column, means for feeding a mixture of gases into said column, and means for detecting the flow of gases out of said column; the improvement comprising carbonized resin microspheroids as the packing material within said column.

3,988,920
METHOD FOR DETECTING A LEAK IN A REACTION TUBE WHEN FORMING A IIIA-VB COMPOUND

Günter Raab, Erlangen, and Klaus Zeuch, Eckental, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 24, 1975, Ser. No. 561,341
Claims priority, application Germany, Mar. 27, 1974, 2414788
Int. Cl.² G01M 3/06, 3/34
U.S. Cl. 73—40.7 8 Claims

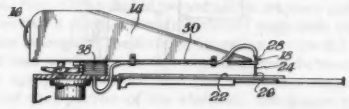


1. A method of detecting leaks in a reaction ampoule containing components such as the components of an AIII-BIV compound, at least one of which components is a volatile component which will react, particularly the components As, P and S, the ampoule being held under pressure in a pressure vessel for carrying out a synthesis of the compound comprising the steps of:
a. pressurizing the pressure vessel with a gas mixture which includes a gas in an amount between 0.5 and 25% by volume, which is capable of reacting with the highly volatile components to form a visible fog
b. maintaining the pressure in the pressure vessel at essentially the pressure within said ampoule; and
c. observing the inside of the pressure vessel for the presence of a fog, such presence indicating that a leak has occurred.

3,988,921
METHOD AND APPARATUS FOR SPOTTING CHROMATOGRAPHIC ELEMENTS

Gene E. Lightner, R.D. No. 1, Kennett Square, Pa. 19348

Filed Feb. 8, 1974, Ser. No. 440,807
Int. Cl.² B01D 15/08
U.S. Cl. 73—61.1 C 12 Claims



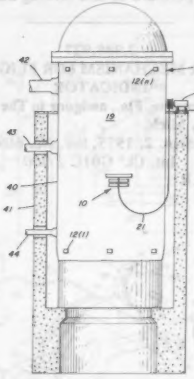
1. A method of using a capillary tube for reproducibly depositing a predetermined quantity of a liquid sample on a chromatographic element comprising the steps of:
A. dipping one end of said capillary tube into a first sample, and controlling the pressure to draw a controlled volume of said sample into said tube by coupling a closed resilient container to said other end of said capillary tube thereby to control the volume of said sample volume,
B. positioning said end of said capillary tube contiguous said chromatographic element,
C. applying fluid pressure to the other end of said capillary tube, thereby to deposit said liquid sample on said element in a controlled volume, and

D. repeating steps (A), (B), and (C) in said controlled manner to discharge from said tube and to deposit on a second element a predetermined quantity of a second liquid sample equal in amount to said quantity of said first sample deposited through steps (A), (B) and (C).

3,988,922
VESSEL EXAMINATION SYSTEM

Jack Phillip Clark; Thurman Dale Smith, and Alan Carl Foster, all of San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

Filed Jan. 13, 1975, Ser. No. 540,607
Int. Cl.² G01N 9/24
U.S. Cl. 73—67.8 S **26 Claims**



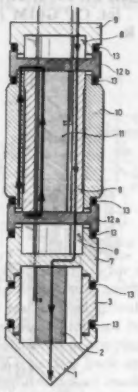
1. Apparatus for examining a vessel formed of magnetic metal comprising:
- a remotely controlled vehicle including a frame and having a longitudinal axis;
- magnetic means for providing adherence of said vehicle to said vessel while allowing movement of said vehicle over the surface of said vessel;
- propelling means for propelling said vehicle in the direction of said longitudinal axis;
- steering means for turning said vehicle;
- remotely operable controlling means for controlling said propelling and steering means;
- indicating means for indicating the location of said vehicle on said vessel including;
- generating means for generating an acoustic vehicle location signal, transmitting means mounted on said vehicle for transmitting said acoustic signal through the walls of said vessel, at least three acoustic signal detectors positioned at spaced locations on said vessel for receiving said acoustic vehicle location signal and for producing output signals in response thereto, and triangulation means connected to said detectors and responsive to said output signals from said detectors to provide an indication of the location of said vehicle on said vessel;
- and scanning means mounted on said frame of said vehicle in proximity to the surface of said vessel for examining local portions of said vessel.

3,988,923
MEASURING DEVICE

Rochus B. Elmiger, Berlin, and Harald Beck, Hamburg, both of Germany, assignors to H. Maihak A.G., Hamburg, Germany

Filed Mar. 20, 1975, Ser. No. 560,561
Claims priority, application Germany, Apr. 5, 1974, 2416647
Int. Cl.² G01N 3/00
U.S. Cl. 73—84 **11 Claims**

1. In a measuring device, particularly in a probe for measuring peak pressure and skin friction in soil, a combination comprising a probe body adapted to be driven into a substrate to be measured and having a leading end, a trailing end and a tubular member extending in a direction from said trailing end towards said leading end to transmit driving pressure to said leading end; first detecting means in said body anad operative for detecting peak pressures which develop as said body is driven into the substrate; second detecting means also



in said body and operative for detecting skin friction which develops as said body is driven into the substrate, said second detecting means including a skin-friction sleeve having an outer sleeve diameter which exceeds the maximum outer diamter of any other component of said body; and separate conductors connected with said first and second detecting means, respectively, for carrying signals originating in the same.

3,988,924
METHOD OF REGENERATING AN INSPECTION PENETRANT SOLVENT

James R. Alburger, 5007 Hillard Ave., La Canada, Calif. 91011

Continuation-in-part of Ser. No. 577,323, May 14, 1975, which is a continuation-in-part of Ser. No. 327,559, Jan. 29, 1973, abandoned. This application Aug. 20, 1975, Ser. No. 606,285
Int. Cl.² G01N 21/16; B08B 7/04
U.S. Cl. 73—104 **9 Claims**

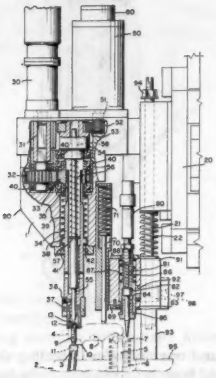
1. In an inspection penetrant process which includes the steps of (1) applying a water-insoluble dyed liquid penetrant to test surfaces, (2) applying a solvent remover to said penetrant-treated test surfaces to dissolve and remove excess surface penetrant, leaving entrapments of penetrant in any surface cracks which may be present, and (3) inspecting said test surfaces for the presence of flaw-entrapment indications, the improvement which comprises the following steps carried out in repetitive sequence:
- a. Raise the temperature of a reservoir of said solvent remover to a control temperature sufficient to produce a separation of said remover into a top liquid layer of glycol-ether-type concentrate and a bottom liquid layer of water having a controlled concentration of glycol-ether-type material,
- b. Withdraw liquid from said bottom liquid layer, and lower the temperature of said withdrawn liquid to a desired operating temperature for treatment of test surfaces,
- c. After using said cooled solvent remover to dissolve dyed liquid penetrant from said test surfaces, raise the temperature of the used remover solution to the said control temperature, and return said used remover to said solvent remover reservoir,

said solvent remover comprising a mixture in water of a glycol-ether-type solvent liquid having a negative temperature coefficient of water solubility.

3,988,925
VALVE LASH ADJUSTING TOOL AND METHOD THEREFOR

Robert J. Seccombe, Detroit; Edwin E. Rice, Ann Arbor; William F. Hurtubise, Plymouth, and Ronald K. Mudge, Brighton, all of Mich., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Nov. 21, 1975, Ser. No. 634,078
Int. Cl.² G01M *15/00*
U.S. Cl. 73—119 R **20 Claims**



8. Apparatus for automatically setting valve linkage adjustment in an internal combustion engine comprising:

a mounting means for the apparatus;

rotating means for adjusting the valve linkage threaded adjusting device;

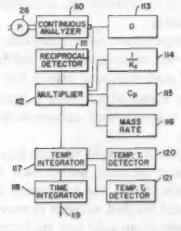
sensing means for determining movement of the valve; and

rotation limiting means in operating relationship with said rotating means for determining the amount of rotation of said rotating means, said rotation limiting means being activated in response to said sensing means determining a valve position.

3,988,926
METHOD OF DETERMINATION OF THE TOTAL AMOUNT OF ENERGY TRANSFERRED BY A FLOWING FLUID

Rudy M. Haas, 8171 Forestlawn, Detroit, Mich. 48234

Continuation-in-part of Ser. No. 141,749, May 10, 1971, Pat. No. 3,727,048. This application Apr. 9, 1973, Ser. No. 349,622
Int. Cl.² G01N *25/00*
U.S. Cl. 73—15.4 **9 Claims**



1. The method of determination of the total amount of energy transferred by a flowing fluid in excess of that which an equal mass of said fluid would have at the same initial temperature as the material with which said flowing fluid is to come in contact comprising the introduction of an analyzable tracer component at a known mass rate into the flowing fluid, mixing the tracer with the flowing fluid, passing the mixture of tracer and fluid through a cross sectional area, determining the instantaneous flow rate of tracer through the cross sectional area, analyzing said mixture at the cross sectional area to determine the concentration of the tracer, determining the temperature of the flowing fluid at the cross sectional area, determining said initial temperature of the material to which the amount of energy is to be transferred, and double integrating with respect to temperature and time the product of the reciprocal of the determined tracer concentration, the heat capacity of the flowing fluid, and the density of the flowing fluid over the temperature of said flowing fluid and the initial

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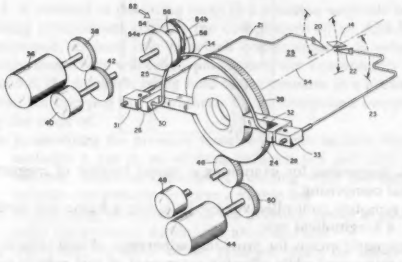
3,988,927
COMMAND BAR MECHANISM FOR FLIGHT DIRECTOR INDICATOR

Ronald E. Cox, Margate, Fla., assignor to The Bendix Corporation, Southfield, Mich.

Filed Sept. 2, 1975, Ser. No. 609,636
Int. Cl.² G01C *21/00*
U.S. Cl. 73—178 R **3 Claims**



1. In a steering command indicator having a longitudinal axia and a front face perpendicular thereto and including an indicating command member lying in and defining a line positionable in said front face in accordance with first and second command signals, means for positioning said indicating command member such that the line defined thereby is rotatable about said longitudinal axis and translatable transversely of said longitudinal axis comprising:

a command plate having a perpendicular axis coincident with said longitudinal axis and rotatable thereon and including at least a first pivot having a first pivot axis which lies in a plane perpendicular to said longitudinal axis;

command member carrying means comprising at least a first strut, said strut being perpendicular to said pivot axis and pivotable thereon, said strut having a position within its pivot range wherein it is parallel to said longitudinal axis, said carrying means additionally comprising a bail generally parallel to said front face, said strut extending to said front face, said command member being affixed to the end of said strut at said front face;

a helical cam cooperating with said bail;

a motor responsive to said first command signal to activate said helical cam to pivot said strut on said pivot axis to thereby effect translation of said line transversely of said longitudinal axis; and,

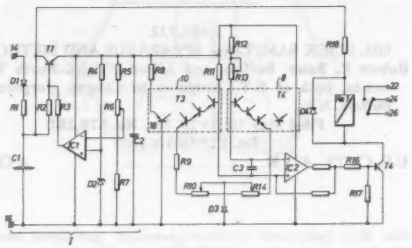
means for rotating said command plate on its perpendicular axis in accordance with said second command signal to thereby effect rotation of said line about said longitudinal axis.

3,988,928

DEVICE FOR MEASURING AND/OR MONITORING THE FLOW VELOCITY OF A FLOWING FLUID

Lennart Edstrom, and Kent Uddin, both of Lulea, Sweden, assignors to AB Elektronik-Konstruktioner, Lulea, Sweden

Filed Nov. 26, 1974, Ser. No. 527,342
Claims priority, application Sweden, Dec. 3, 1973, 7314197
Int. Cl.² G01F 1/68
U.S. Cl. 73—204 10 Claims



1. In a device for monitoring the flow velocity of a flowing fluid, comprising:

temperature sensing means adapted for location in said flowing fluid,

means for supplying constant electrical power to said sensing means so as to obtain a constant temperature excess therein relative to ambient temperature, whereby a temperature reduction in said sensing means caused by said flowing fluid will be related to said flow velocity,

the improvement wherein:

said sensing means comprises first and second essentially identical monolithic integrated circuits, each arranged in a respective heat conducting case, each of said integrated circuits comprising a crystal carrying a plurality of series connected integrated diodes forming a diode path and serving as a temperature sensor, both of said essentially identical crystals in addition including an integrated semiconductor heating member having a low temperature coefficient, said heat conducting cases being fastened to a sheet located in the flow path of the flowing with the plane of the sheet extending substantially in parallel to the flow direction of the flowing fluid and with said heat conducting cases located substantially in the same plane transverse to said flow direction,

a radiation shield mounted on said sheet between said two heat conducting cases,

said constant power supplying means includes means for supplying a substantially constant voltage to said heating member of only said first crystal and thereby developing substantially constant power in said first crystal over a large temperature range,

means is provided for supplying current in the forward direction in said two diode paths, and

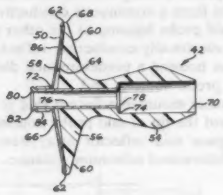
a comparison circuit is connected to said two diode paths for comparing the forward-direction currents flowing respectively therein and producing a difference signal corresponding to the difference between said forward-direction currents, said difference signal representing the fluid flow velocity.

3,988,929

HANDLE AND REFLECTOR ASSEMBLY FOR MICROWAVE OVEN FOOD TEMPERATURE SENSING PROBE

James A. White, and Richard E. Hornung, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Dec. 22, 1975, Ser. No. 643,091
Int. Cl.² G01K 1/08, 7/24; H05B 9/06
U.S. Cl. 73—352 5 Claims



1. A handle and reflector assembly for a microwave oven food temperature-sensing probe, said assembly comprising:

a. a reflector made of resilient, electrically-conductive material and having a centrally-located hole;

b. an insulating member having a gripping portion for manual manipulation, a reflector back-up portion, and an axial bore extending through said insulating member and opening in the center of said back-up portion,

said back-up portion configured to contact one side of said reflector in an annular region near the periphery of said reflector and to be spaced from said reflector in the region bounded by the annular region, and

said axial bore including an internal holding ledge; and

c. a sleeve inserted through said axial bore in said insulating member and through the hole in said reflector,

one end of said sleeve having an internal flange contacting said internal holding ledge on the side of said ledge opposite the opening in said back-up portion, and

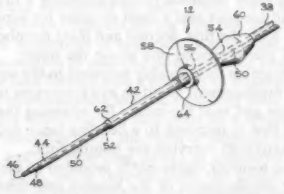
the other end of said sleeve extending out the opening in said back-up portion and through the hole in said reflector and having means for contacting the other side of said reflector to elastically deform said reflector, said sleeve being in tension and said reflector being in compression.

3,988,930

MICROWAVE OVEN FOOD TEMPERATURE-SENSING PROBE

Louis H. Fitzmayer, and Richard E. Hornung, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Dec. 22, 1975, Ser. No. 643,110
Int. Cl.² G01K 1/08, 7/24; H05B 9/06
U.S. Cl. 73—352 6 Claims



1. A temperature-sensing probe assembly for monitoring the internal temperature of food being cooked in the cooking cavity of a microwave oven, said probe assembly comprising:

a. a probe adapted for insertion into food to be cooked, said probe including an elongated conductive housing, the tip end of which is closed and shaped to facilitate insertion

into the food, and said probe further including a temperature-sensing electrical element positioned internally of the housing near the tip end;

b. a flexible shielded cable for connecting said electrical element to circuitry responsive to thermally-induced changes in a characteristic of said electrical element, the cable shield being electrically connected at one end to the connection end of said probe housing and adapted at the other end for connection to a wall of the cooking cavity, said probe housing and the cable shield thereby cooperating to form a continuous conductive sheath from the tip of said probe housing to the other end of said cable;

c. an electrically-conductive reflector mounted on said probe housing a predetermined distance from the tip of said probe housing; and

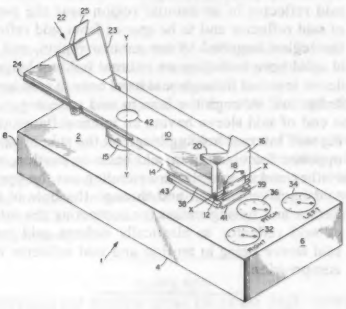
d. a spacer mounted adjacent said reflector and extending toward the tip of said probe housing, said spacer serving to space said reflector away from the food at least a predetermined minimum distance.

3,988,931

APPARATUS AND METHOD FOR MEASURING MUSCULAR STRENGTH OF LOWER HUMAN EXTREMITIES

John S. Perryman, 17 S. Point Terrace, Kinnelon, N.J. 07405

Filed May 8, 1975, Ser. No. 575,741
Int. Cl.² G01L *5/02*
U.S. Cl. 73—379 **14 Claims**



1. Apparatus for measuring and indicating forces applied to the lower extremities of a human body comprising:

displaceably mounted means for supporting a suitably booted foot of a subject including means for retaining the toe of the booted foot and means for retaining the heel of the booted foot, and the displaceably mounted means displaced in response to forces applied to a lower extremity carrying the booted foot;

the displaceably mounted means including a first member, a second member and a third member for supporting the booted foot, the first, second and third members being in parallel planes spaced one above the other;

the third member displaceably mounted to the second member for displacement about an axis transverse to the parallel planes and near the means for retaining the toe of the booted foot in response to a bending force applied to the lower extremity carrying the booted foot;

the second member displaceably mounted to the first member for displacement of the second and third members about an axis normal to the parallel planes and intermediate the means for retaining the toe of the booted foot and the means for retaining the heel of the booted foot in response to a torsional force applied to the lower extremity carrying the booted foot;

friction adapting means disposed intermediate the first and second members and near the transverse axis for providing a predetermined friction characteristic upon combined application of the bending and torsional forces, and including a friction device carried by the first member, a friction adapter disposed intermediate the friction device and the second member, and the friction device and friction adapter cooperating to provide the predetermined friction characteristic;

means connected to the displaceably mounted means for transmitting the displacements thereof;

sensing means connected to the displacement transmitting means for sensing the transmitted displacements; and

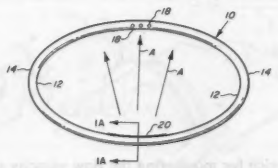
means connected to the sensing means and responsive to the sensed displacements for measuring and indicating the applied forces.

3,988,932

OIL SLICK SAMPLING APPARATUS AND METHOD

Robert E. Baier, Buffalo, and Alfred Wright, North Tonawanda, both of N.Y., assignors to Calspan Corporation, Buffalo, N.Y.

Filed May 16, 1975, Ser. No. 578,281
Int. Cl.² G01N *1/00*
U.S. Cl. 73—421 R **4 Claims**



1. A method of determining the quantity of a lighter liquid floating on an area of determined size of a body of water and collecting the lighter liquid for further analysis, comprising the steps of:

a. floating a continuous member on the surface of said body of water to surround an area of determined size,

b. coating with a surfactant at least portions of the peripheral length of said continuous member facing the area surrounded by said member whereby said surfactant is effective to cause the lighter liquid with the area of said continuous member to be directed to a predetermined area,

c. collecting said lighter liquid at said predetermined area for analysis, and

d. said continuous member comprising a hollow tube having at least one inlet opening in a portion thereof facing the area surrounded by said member and substantially opposite and spaced from the portions thereof coated with said surfactant whereby said surfactant causes the lighter liquid to be directed toward said inlet opening to be collected thereby.

3,988,933

FLUID MASS SENSOR FOR A ZERO GRAVITY ENVIRONMENT

James C. Fletcher, Administrator of the National Aeronautics and Space Administration with respect to an invention of, and G. L. Fogal, Wayne, Pa.

Filed Nov. 7, 1974, Ser. No. 521,816
Int. Cl.² G01L *19/14*
U.S. Cl. 73—432 R **3 Claims**

1. An apparatus for sensing and measuring fluid mass, said apparatus comprising:

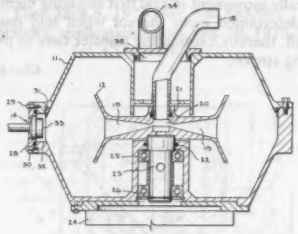
housing means having inlet means for receiving a liquid-gas fluid stream into said housing means;

outlet means in said housing means for the dumping of fluid from said housing means;

means for introducing a liquid-gas stream into said housing means through said inlet means;

multi-bladed rotary impeller means within said housing means for imparting centrifugal motion to said fluid to form a liquid vortex within said housing means and to separate said fluid into its gas and liquid phases;

power means connected to said rotary impeller means for effecting rotation thereof;



speed controller means operatively associated with said power means for maintaining the rotary speed of said impeller means at a constant number of revolutions per minute; and

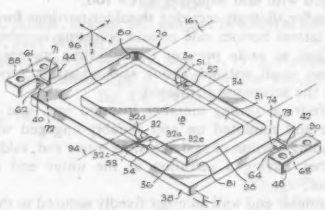
pressure sensitive transducer means mounted in said housing for sensing the centrifugal liquid pressure and producing an electrical signal indicative of said pressure and representative of said fluid mass.

3,988,934

HANDWRITING SENSING AND ANALYZING APPARATUS

Fred J. Kamphoefner, Atherton, and Gerry B. Andeen, Menlo Park, both of Calif., assignors to Stanford Research Institute, Menlo Park, Calif.

Filed Jan. 5, 1976, Ser. No. 646,657
Int. Cl.² G01L 5/16
U.S. Cl. 73—432 R **11 Claims**



1. Apparatus for sensing handwritten markings, comprising:

a frame;

a platen having a primarily horizontally-extending support surface for supporting forces produced by the tip of a writing instrument;

beam means including at least one beam having a first end connected to said platen and a second end;

means for coupling said second end of said beam to said frame; and

gauge means coupled to said beam, to sense deflection thereof;

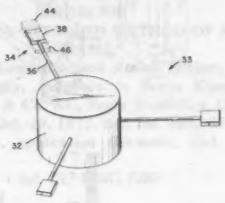
said beam extending in substantially the same plane as said platen between said platen and said coupling means.

3,988,935

DYNAMIC BALANCER FOR SPINNING BODIES

Harold A. Rosen, Santa Monica, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 27, 1975, Ser. No. 562,719
Int. Cl.² G01M 1/36
U.S. Cl. 73—458 **6 Claims**



1. An apparatus for dynamically balancing a free spinning body having a plurality of members radially deployed to a first position, said members having a resultant center of gravity axially displaced from the center of gravity of said body, comprising:

means for measuring the dynamic imbalance of said spinning body; and

means for individually radially displacing at least one of said members from said first position in response to said measured dynamic imbalance to thereby minimize the dynamic imbalance.

3,988,936

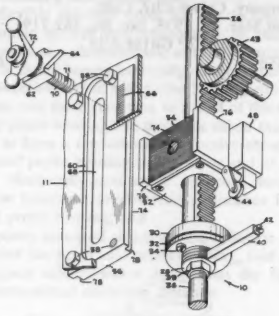
CONVEYOR INDEXING MECHANISM

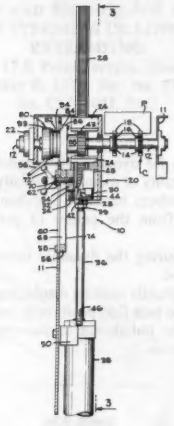
Daniel P. Comly, Jr., Holland, Pa., assignor to FMC Corporation, San Jose, Calif.

Filed May 27, 1975, Ser. No. 580,644
Int. Cl.² F16H 19/04
U.S. Cl. 74—34 **1 Claim**

1. Conveyor indexing mechanism comprising a conveyor, a rack and pinion gear in constant mesh, means for longitudinally reciprocating said rack, a power operated jaw clutch including a driven element connected to said conveyor and a driving element connected to said pinion gear, said clutch elements having a plurality of radially disposed mating teeth, control means connected to said clutch for engaging said driving and driven elements during only one direction of said longitudinal movement of said rack, a stop plate for limiting the rack movement in said one direction, said stop plate having a planar face formed with a plurality of transversly extending teeth, a corresponding toothed mounting plate, and means for adjustably mounting said stop plate on a longitudinal path along said mounting plate, the pitch of adjacent teeth on said stop plate and its mounting plate, as measured along said adjustment path, being derived from the piston rod stroke required to rotate said clutch for one revolution divided by the number of clutch teeth on said driving and driven clutch elements, said teeth on said stop and mounting plates being disposed at an angle relative to a line that is normal to the linear path of adjusting movement of said stop plate on said mounting plate, said teeth having the pitch of a standard cutter as measured along a line normal to the crest lines of

adjacent teeth so that the stop plates can be precisely machined by standard cutters to be compatible with said clutch





teeth by selecting the angle of disposition of said teeth on said plates.

3,988,937

DEVICE FOR PRODUCING FEEDING STROKE OF TRANSFER FEEDER FOR USE IN TRANSFER PRESS

Makoto Higuchi, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 10, 1975, Ser. No. 639,589

Claims priority, application Japan, Dec. 10, 1974, 49-148876[U]

Int. Cl.² F16H *21/32*

U.S. Cl. 74—45 **4 Claims**

1. In a device for producing the feeding stroke of a transfer feeder for use in a transfer press, said device having a carrier for mounting thereon a pair of parallelly spaced transfer bars extending in the longitudinal direction of a working table of said press, said carrier being slidingly supported by a pair of guide rods extending parallel to said transfer bars and being connected through a transmitting mechanism to a driving source or said press, the improvement characterized in that said transmitting mechanism comprises:

a. a pair of gears engaged with each other, one of which is a drive gear rotated by said driving source;

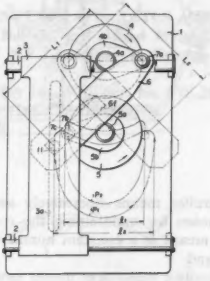
b. a pair of levers, each fixedly secured at its proximal end to respective rotatable shaft of said gears;

c. a link pivotally connected at its proximal end to the distal end of one of said levers, said link having a straight elongated recess formed in the back thereof and extending in the longitudinal direction thereof;

d. a first engaging member pivotally mounted on the distal end of the other lever and slidingly engaged with the recess of said link;

e. a straight elongated groove formed in the back of said carrier and extending in the direction perpendicular to said transfer bars;

f. a second engaging member pivotally mounted on said link and slidingly engaged with the groove of said carrier, whereby said carrier is reciprocally moved together with said transfer bars along said guide rods following to a cyclically movement of said first engaging member traced at a determined locus thereof when said pair of gears rotated, thereby causing the transfer bars to produce the feeding stroke;



g. a pair of bearing boxes, one of them being fixedly secured to the distal end of the link and having thereinto a cylindrical hollow space, and the other bearing box being fixedly secured to a longitudinally intermediate portion of the link;

h. an adjusting screw rod, one end thereof being rotatably supported by said one of bearing boxes, and the other end being rotatably supported by said the other bearing box;

i. an extending portion of said adjusting screw rod inserted through and projected outwardly of said annular hollow space of said one of bearing boxes;

j. an adjusting member mounted on said link for rotatably mounting said second engaging member and threadingly engaged with said adjusting screw rod;

k. means for slidingly securing shoulder portions formed at each lateral bottom side of said adjusting member onto said link so as to prevent the adjusting member from rotation itself rotated about said adjusting screw rod when the screw rod is rotated;

l. a cylindrical sliding member inserted into said hollow space and mounted on and slidably engaged with the extending portion of said adjusting screw rod, said sliding member having a serration at the outer end surface thereof;

m. an annular end wall member fixedly secured to the distal end face of said one of bearing boxes and having a serration at the inner end surface thereof, said serration being engageable with that of said sliding member;

n. a compression spring provided around the extending portion of said adjusting screw rod and between said sliding member and the inner end wall of said hollow space so as to normally urge the sliding member toward said end wall member to engage the serration of said sliding member with that of said end wall member; and

o. a sleeve slidably inserted in an annular space defined between the extending portion of said adjusting screw rod and said end wall member, one end thereof being abutted against the sliding member and the other end being projected outwardly of said end wall member, wherein the position of said adjusting member as well as said second

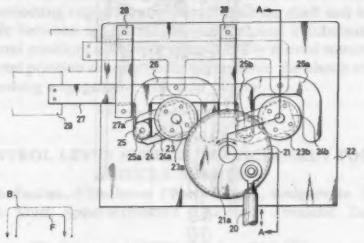
engaging member on said link is adjusted when pushing said sleeve into the hollow space of said one of bearing boxes so as to disengage the serration of said sliding member from that of said end wall member and when rotating said adjusting screw rod, thereby adjusting the feeding stroke of the transfer feeder.

3,988,938

GATE MOTION MECHANISM

Seiji Nagai, Hiroshima, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 5, 1975, Ser. No. 583,967
Claims priority, application Japan, Jan. 30, 1975, 50-12688
Int. Cl.² F16H *25/12*
U.S. Cl. 74—53 **5 Claims**



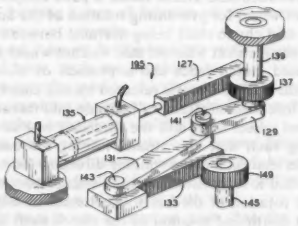
1. In a gate motion mechanism for continuously driving an arm to perform a gate motion, or a combination of two or more differently directed rectilineal motions, which has a cam groove of a contour corresponding to the path of motion which the arm follows, and a guide roller integrally connected to the arm and fitted in the cam groove and linked to a driving mechanism via a lever for sliding movement along the groove, the improvement therein, wherein the driving mechanism comprises a rod to be driven reciprocatingly by a separate driving mechanism, a drive gear pivotally supporting one end of the rod and rotatably pivoted by a frame, and a pinion gear secured to the lever in mesh with the drive gear.

3,988,939

METHOD AND APPARATUS FOR CONVERTING MOTION

Jesse A. Stoner, Dekalb, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 401,177, Sept. 27, 1973, abandoned. This application Sept. 5, 1974, Ser. No. 503,389
Int. Cl.² F16H *21/40*
U.S. Cl. 74—70 **16 Claims**



1. A method of converting non-harmonic acceleration of linear reciprocal motion into generally sinusoidal acceleration comprising the steps of:

a. transforming non-harmonic acceleration of the linear reciprocating motion of a driving means into complementary rotary motion through a predetermined arc of other means adapted to be driven by the driving means, said other means including a rotatably mounted shaft, and a pinion gear on the shaft; and

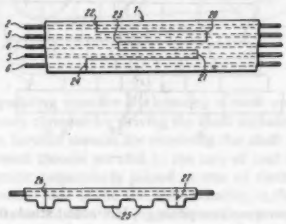
b. translating the complementary rotary motion of the other means into generally sinusoidal acceleration by conjointly moving one of a pair of articulated means fixedly connected with the shaft through the predetermined arc and drivingly interconnecting the other of the articulated means pivotally with a driven means so as to move it linearly and reciprocally with the sinusoidal acceleration between a pair of indexing positions.

3,988,940

TRANSMISSION BELT AND METHOD OF MAKING SAME

Reinhold Szonn, Lemforde, and Rudolf Breher, Hausberge, both of Germany, assignors to Breco Kunststoffverarbeitungs-GmbH & Co. KG, Porta Westfalica, Germany

Filed Oct. 19, 1973, Ser. No. 408,005
Claims priority, application Germany, Oct. 20, 1972, 2251454
Int. Cl.² F16G *1/00*
U.S. Cl. 74—231 J **9 Claims**



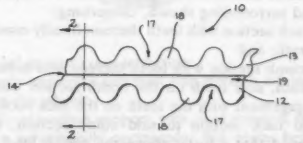
2. An endless toothed transmission belt comprising, in combination, a web of elastic belt material having pull-resistant strength carriers embedded therein and extending in the longitudinal direction of said web, a portion of said belt having interengaging and interfitting tongue means extending in the longitudinal direction of said belt with longitudinal abutting edges parallel to said strength carriers and intimately bonded uniformly to each other at an impact location, each of said tongues spanning a plurality of teeth of said toothed belt having at least one strength carrier extending through said tongue, so that strength carriers of adjacent tongues are spaced transversely and are connected in a bond between adjacent tongues particularly along longitudinal edges.

3,988,941

DRIVE BELT

Thomas R. Smith, 710 W. 11th St. South, Newton, Iowa 50208

Filed Aug. 1, 1975, Ser. No. 601,401
Int. Cl.² F16G *1/00, 1/28, 5/00*
U.S. Cl. 74—231 R **2 Claims**



1. A drive belt construction comprising an endless elongated resilient member having a pair of generally back-to-back V-belt shaped portions on opposite sides of a longitudi-

nally extending midline forming a double sided V-belt, said elongated member including opposite undulating surfaces defining a plurality of recesses extending transversely across each V-belt shaped portion spaced along the length of said elongated resilient member with recesses in one V-belt shaped portion being staggered and effectively disposed symmetrically inbetween the recesses in the other V-belt shaped portion, said recesses and the remaining V-belt shaped portions therebetween defining a uniform sinuous belt body whereby the height of a transverse section normal to said midline remains substantially constant, and longitudinally extending reinforcing means disposed at generally said midline to provide longitudinal strength and dimensional stability.

3,988,942

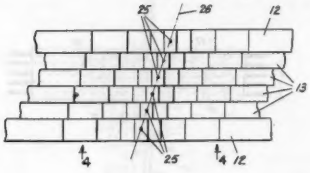
LAMINATED GEAR

Harry M. Greiner, Offenbach, Germany, assignor to Roland Offsetmaschinenfabrik Faber & Schleicher AG, Germany

Filed Apr. 28, 1975, Ser. No. 572,290

Int. Cl.² F16H *55/12*; B21D *53/28*

U.S. Cl. 74—445 **6 Claims**



1. A spur gear comprising a laminated stack of axially thin identically-profiled spur gear elements having straight axially-extending teeth of involute form and means for securing them flatly together in coaxial relation with stepped increments of angular phasing between them.

3,988,943

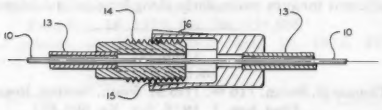
APPARATUS FOR AUTOMATIC CABLE CALIBRATION

John W. Orcutt, Norton, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 19, 1974, Ser. No. 443,591

Int. Cl.² F16C *1/10*

U.S. Cl. 74—501 P **5 Claims**



1. A cable calibration device for a cable comprised of a core wire and surrounding sheath, comprising:

a. a rack section with teeth thereon fixedly mounted on said sheath; and

b. a comb section with teeth thereon also mounted on said sheath, said teeth on the comb section being biased in engagement with the teeth on the rack section to secure said rack section to said comb section, the teeth so shaped that a force above the design load of the cable would cause the teeth on the rack and comb sections to move over each other in either of two opposite directions thereby shortening or lengthening the sheath to calibrate the cable.

3,988,944

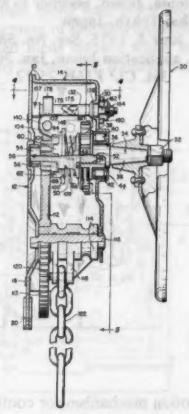
QUICK-RELEASE MECHANISM FOR A RAILWAY CAR HAND BRAKE OF THE NON-SPIN TYPE

Wayne G. Klasing, New Lenox, Ill., assignor to Klasing Hand Brake Co., Joliet, Ill.

Continuation of Ser. No. 456,638, April 1, 1974, abandoned. This application Oct. 1, 1975, Ser. No. 618,503

Int. Cl.² G05G *1/08*

U.S. Cl. 74—505 **1 Claim**



1. In a hand brake assembly of the type which embodies a rotary chain-winding drum having a main winding gear thereon, an axially-shiftable clutch shaft having a cylindrical bearing section, a splined slide section, and a radial flange thereon, said radial flange being formed with a generally frusto-conical rear face, a pinion mounted directly on said bearing section and rotatable freely thereon, said pinion meshing with said winding gear, a clutch collar mounted on and splined to said splined section, slidable directly into and out of clutching engagement with the pinion, and rotatable in unison with the clutch shaft, said clutch collar being formed with an annular seating groove in the peripheral region of the forward face thereof, an axially fixed hand wheel shaft coaxial with said clutch shaft, said hand wheel shaft being formed with a threaded socket therein, the adjacent end of the clutch shaft being threadedly received in said socket for limited axial shifting movement of the clutch shaft in opposite directions upon relative turning movement between the two shafts in opposite directions respectively, a clutch face on said clutch shaft, an opposing clutch face on said hand wheel shaft, a ratchet wheel freely rotatable on said hand wheel shaft and disposed between said clutch faces, a pawl cooperating with said ratchet wheel for preventing rotation of the latter in one direction, said clutch shaft being movable between a position of clutch engagement wherein said ratchet wheel is clamped between said clutch faces and a position of clutch release wherein said ratchet wheel is released by said clutch faces, the extend of threaded engagement between said threaded socket in the hand wheel shaft and the threaded end of the clutch shaft being such that upon initial turning movement of the hand wheel shaft in a drum-winding direction the clutch shaft will be shifted to its position of clutch engagement, after which continued rotation of the hand wheel shaft in said direction will effect continued rotation of the clutch shaft in the same direction, and that upon turning movement of the hand wheel shaft in the reverse direction the clutch faces will release said ratchet wheel and effect a graduated reverse rotation of the clutch shaft in a drum-unwinding direction, and a shift fork mounted for swinging movement in a plane parallel to the axis of said clutch collar and engageable with the collar for moving the same positively in opposite directions, the improvement

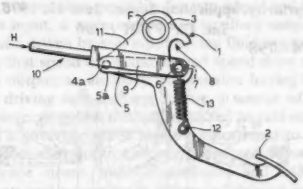
which comprises a helical compression spring encircling said splined section of the clutch shaft and interposed between said clutch collar and the radial flange on the clutch shaft with its rear end seated within an annular seating groove which is formed in the forward face of the clutch collar and its forward end seated upon and thus centered by said generally frustoconical rear face of the radial flange on said clutch shaft, said spring yieldingly biasing said clutch collar into meshing engagement with said pinion, a cam shaft in the vicinity of said shift fork, a first cam on said cam shaft and capable during rotation of the latter in one direction of engaging and swinging the shift fork in a direction to effect clutch collar and pinion engagement, a second cam on said cam shaft and effective during rotation of the cam shaft in the opposite direction to engage and swing the shaft fork in a direction to effect clutch collar and pinion disengagement, and a lever on said cam shaft for selectively rotating the latter in opposite directions, said lever projecting radially outwardly of the cam shaft and being movable between a substantially vertical and a substantially horizontal position, said lever when forcibly moved toward its horizontal position serving positively to force the clutch collar into meshing engagement with said pinion.

3,988,945

CONTROL LEVER SYSTEM, PARTICULARLY FOR VEHICLE BRAKES

Osvaldo Fasano, Villarbasse (Turin), Italy, assignor to Start S.p.A. Studi Apparecchiature e Ricerche Tecniche, Turin, Italy

Filed Apr. 11, 1975, Ser. No. 567,336
Claims priority, application Italy, Apr. 17, 1974, 68224/74
Int. Cl.² G05G *1/14*
U.S. Cl. 74—512 **5 Claims**



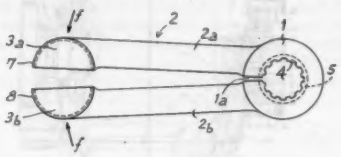
1. In a control lever mechanism of the type comprising:
a control lever having a fixed end carried on a fixed fulcrum and a free end, said lever being turnable about said fixed fulcrum upon the application of a force to said free end thereof,
a force transmission member linking said control lever with an element to be controlled, and
pivotal connection means connecting said force transmission member to said control lever, said pivotal connection means forming a second fulcrum on said control lever,
the improvement wherein,
said second fulcrum is displaceable with respect to said control lever, there are provided:
guide means for guiding the displacement of said second fulcrum along an arcuate path which brings it closer to or further away from said first fulcrum,
resilient biasing means urging said second fulcrum along said arcuate path away from said first fulcrum, and
limit stop means for limiting the movement of said second fulcrum along said arcuate path, and
said guide means are positioned such that the centre of curvature of said arcuate path defined thereby lies on one side of the line of action of said force transmission member when said control lever is at one end of its range of pivotal movement about said first fulcrum, and on the other side of said line of action when said control lever is at the other end of its said range of movement, whereby the force exerted on said second fulcrum by said force transmission member in reaction to a force applied in one direction to said free end of said control lever urges said second fulcrum towards one end of said arcuate path when
said control lever is at said one end of said range of movement and towards the other end of said arcuate path
when said control lever is at said other end of said range of movement.

3,988,946

MANIPULATING MEMBER FOR A ROTATING SHAFT

Boris Gonzalez, Issy-les-Moulineaux, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France

Filed June 6, 1975, Ser. No. 584,418
Claims priority, application France, June 20, 1974, 74.21476
Int. Cl.² G05G *1/10, 1/12*
U.S. Cl. 74—545 **10 Claims**



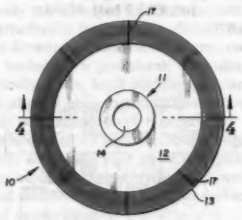
1. A manipulating member for rotating a shaft comprising at least one body element for driving the shaft including a boss having a bore formed therein for receiving the shaft and having a slot formed therein parallel to the axis of said bore and two spaced parts respectively joined at one of their ends to said boss on either side of the slot and including at their other end a generally semicylindrical projection whose axis is parallel to that of the boss; and an annular ring surrounding the two semi-cylindrical projections and maintaining them in close proximity to each other.

3,988,947

COILED FLYWHEEL ASSEMBLY

John Lenz, Coon Rapids, Minn., assignor to Havir Manufacturing Company, St. Paul, Minn.

Filed June 9, 1975, Ser. No. 585,453
Int. Cl.² F16C *15/00*
U.S. Cl. 74—572 **6 Claims**

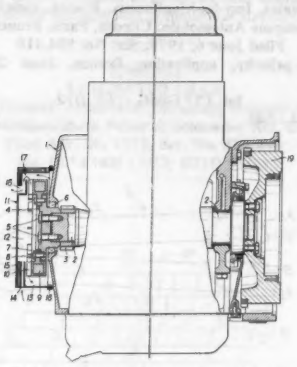


1. A flywheel construction including:
a. a generally centrally arranged hub portion adapted for mounting the wheel;
b. a radially extending support web, said support web including a substantially rectangular flat plate, being secured to said hub; and
c. a rim portion comprising a coiled strip of material being secured to said support web adjacent the radial outer periphery of said plate.

3,988,948
INTERNAL COMBUSTION ENGINE WITH TORSIONAL-VIBRATION BALANCER

Gerhard Thien, and Heinz Fachbach, both of Graz, Austria, assignors to Hans List, Graz, Austria

Continuation-in-part of Ser. No. 405,303, Oct. 11, 1973, abandoned. This application Mar. 4, 1975, Ser. No. 555,238
Claims priority, application Austria, Oct. 13, 1972, 8818/72
Int. Cl.² F16F *15/10*
U.S. Cl. 74—574 **6 Claims**

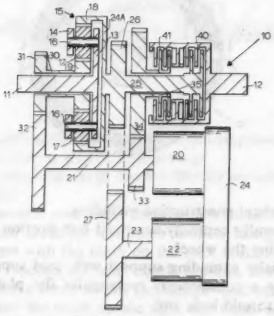


1. An internal combustion engine with a torsional-vibration balancer mounted at one end of the crankshaft, comprising a fan-wheel blower attached to an outer front face of said torsional-vibration balancer, a sound-proofing casing covering said torsional-vibration balancer and said fan-wheel blower and defining a blower housing for said fan-wheel blower, said casing having a cooling-air admission aperture connected with the suction end of the blower and a cooling-air discharge aperture connected with the delivery end of the blower.

3,988,949
SPLIT-TORQUE POWER TRANSMISSION

William E. Weseloh, San Diego, and Elias Orshansky, Jr., San Francisco, both of Calif., assignors to Orshansky Transmission Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 478,719, June 12, 1974, abandoned. This application Aug. 12, 1974, Ser. No. 496,737
Int. Cl.² F16H *47/04*
U.S. Cl. 74—687 **35 Claims**



1. A power transmission including in combination:

input means,

output means,

a planetary gear assembly having only three members which rotate about a common centerline, one said member being a carrier-planet assembly, said three members consisting of an input member connected to said input means and first and second other members which alternate in function so that at some times said first other member serves as an output member and said second other member serves as a reaction member, while at other times said first other member serves as a reaction member and said second other member serves as an output member,

speed-varying means, having a first member mounted on a firsts rotary shaft in driving relation therewith and a second member mounted on a second rotary shaft in driving relation therewith, said first and second members of said speed-varying means being connected together in driving relation by power transmitting means such that power put into one said member drives the other said member, and vice versa, at variable speeds,

first means at all times connecting said first other member to said first rotary shaft,

second means at all times connecting said second other member to said second rotary shaft,

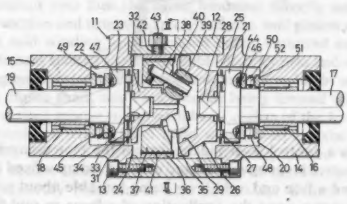
first clutch means for connecting said first other member in driving relation to said output means, and

second clutch means for connecting said second other member in driving relation to said output means.

3,988,950
FRICTIONAL GEARING APPARATUS

Kiyoshi Mori, No. 48, 1-chome, Tenjinnomori, Nishinari, Osaka, Japan

Filed Aug. 21, 1975, Ser. No. 606,435
Claims priority, application Japan, Jan. 11, 1975, 50-5796
Int. Cl.² F16H *13/06*
U.S. Cl. 74—798 **2 Claims**



1. An apparatus for accelerating or decelerating the input rotation at the output, said apparatus comprising a cylindrical casing open at both ends wherein two shafts are disposed rotatably on a same axis extending horizontally in opposite directions out of said casing, one of said shafts at its inward end fixing axially to a dish-like rotary object at its center, said rotary object forming a friction surface of a truncated cone shape at its inside periphery facing axially inward, the other shaft at its inward end fixing to an inwardly tapering conical rotary object forming a friction surface at the outer periphery of its inward end portion, said dish-like rotary object and said conical rotary object in this state confronting axially each other at the inside periphery and the inward end portion respectively, a plurality of globular members of a fixed size being rotatably supported by respective axes in between said rotary objects so as to make rotational and frictional contacts simultaneously with both of said friction surfaces, said shafts each being available for the input and the output in alternation, said dish-like rotary object, globular members each, and conical rotary object at their mutually contacting portions measuring diametrically the biggest, **2nd** and **3rd** in the abovementioned order so that the rotation of the input shaft may be accelerated or decelerated through its transmission to the

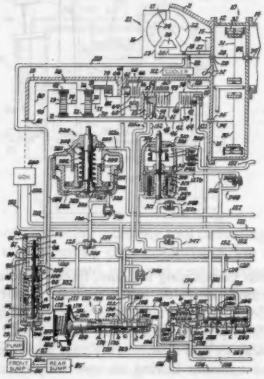
output shaft via said rotary objects and said globular members in proportion to ratios between their diametrical lengths.

3,988,951

FOUR WHEEL DRIVE TRANSMISSION

Alex C. Mair, Bloomfield Hills, and Calvin F. Lundbom, Southfield, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 12, 1975, Ser. No. 557,482
Int. Cl.[2] B60K *41/18*
U.S. Cl. 74—864 11 Claims



1. In a transmission assembly for two wheel and four wheel drives: an input; a main output; an auxiliary output; a main transmission driven by said input having fluid operated means providing first speed drive and second speed drive for driving said main output; an auxiliary transmission having first speed drive for driving said auiliary output; a source of regulated fluid pressure; governor means connected to said main output providing a governor speed signal proportional to said main output speed; shift control means connected to said source, said governor means, main transmission and said auxiliary transmission and operative in a forward driving speed drive range for automatic shifting between a first speed drive position at low speeds and a second speed drive position at high speeds in response to said governor speed signal to control said main transmission and said auxiliary transmission for operation in said first speed drive position at low speeds to establish said first speed drive in said main transmission and said first speed drive in said auxiliary transmission to provide a first speed four wheel drive and for operation at a predetermined higher speed to upshift to said second speed drive position to provide an automatic upshift to establish said second speed drive in said main transmission and to discontinue drive in said auxiliary transmission to provide a second speed main two wheel drive.

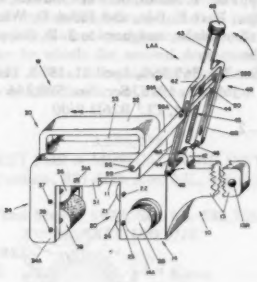
9. In a transmission assembly for two wheel and four wheel drives; an input, a main output; an auxiliary output; a main transmission driven by said input having fluid operated means providing first speed drive and second speed drive for driving said main output; an auxiliary transmission having first speed drive for driving said auxiliary output; a source of regulated fluid pressure; governor means connected to said main output providing a governor speed signal proportional to said main output speed; shift control means connected to said source, said governor means, said main transmission and said auxiliary transmission and operative in response to said governor speed signal to control said main transmission and said auxiliary transmission in one forward drive range position operative at low speeds to establish said first speed drive in said main transmission and at a predetermined higher speed to provide an automatic upshift to said second speed drive in said main transmission and to provide neutral in said auxiliary transmission during both said first speed drive and said second speed drive by said main transmission to provide first and second speed main two wheel drive and in another forward drive range position operative at low speeds to establish said first speed drive in said main transmission and said first speed drive in said auxiliary transmission to provide a first speed four wheel drive and operative at a predetermined higher speed to provide an automatic upshift to said second speed drive in said main transmission and in response to said automatic upshift in said main transmission to discontinue drive in said auxiliary transmission to provide a second speed main two wheel drive.

3,988,952

PORTABLE AND POWERABLY ACTUATABLE PIPE WRENCH

Arthur A. Dirks, 5357 N. 47th St., Omaha, Nebr. 68104

Filed Dec. 15, 1975, Ser. No. 640,423
Int. Cl.[2] B25B *13/48, 17/00*
U.S. Cl. 81—126 5 Claims



1. A portable and powerably actuatable pipe wrench and comprising:

A. A relatively stationary frame member having along the upperside thereof an upstanding medial lug and an elongate handle extending horizontally longitudinally rearwardly therefrom, a frameshank extending downwardly and forwardly of the frame handle and carrying a power train including a pair of vertically aligned pipe-engaging spurs including an upper-spur and a lower-spur that extend forwardly of the frame-shank and a transversely horizontally extending nipple, said power train being powerably actuatable by a suitable external driver means that is removably engageable with said nipple;

B. A relatively movable jaw member including a head portion longitudinally horizontally slidably associated with the upper forward portion of the frame member, the jaw member including a jaw-shank extending downwardly and forwardly of the head portion and carrying a pair of vertically aligned pipe-engaging idler wheels that extend rearwardly of the jaw-shank whereby the two spurs and the two wheels are all simultaneously engageable with a transversely extending pipe to be manipulated; and

C. A locking-adjusting assembly for said movable jaw relative to said stationary frame and transverse pipe therebetween and comprising:

i. a unitary bifurcated lever including a medial web portion, a dual-tines bifurcate forward portion, and an elongated tubular barrel rearward portion having a bore extending forwardly through the lever medial web, the forward part of each lever tine being pivotably attached to the frame member upwardly extending medial lug with a transversely extending lug-pin;

ii. a pillow-block extending transversely between but transversely spaced from the tines;

iii. an elongated adjusting screw engaged with the pillow block, said adjusting screw including a forward nose-

end located forwardly of the lever web and the pillow-block and a rearward tail-end located rearwardly of the lever barrel and to which tail-end is attached an enlarged thumbscrew; and

iv. a pair of elongated transversely separated links, each link having a fore-end pivotably attached to the jaw head portion with a transversely extending pivot-pin permanently located in elevation below the lug-pin, each link having a rear-end pivotably attached to the pillow-block remote of the adjusting screw with a transversely extending pivot-rod located in elevation below the lug-pin when the entire lever is pivoted fully downwardly about said lug-pin but located in elevation above said lug-pin when the entire lever is pivoted upwardly about said assembly pivot-pin.

3,988,953

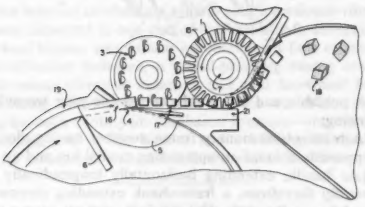
METHOD AND APPARATUS FOR TREATING VEGETABLE SEGMENTS

Roy E. Bosley; Paul T. Mann, both of Caldwell; Gary D. Decoteau, Nampa; Kert F. Ivie, and Elden D. Winslow, both of Caldwell, all of Idaho, assignors to J. R. Simplot Company, Boise, Idaho

Division of Ser. No. 569,960, April 21, 1975. This application July 23, 1975, Ser. No. 598,266

Int. Cl.² B26D 9/00

U.S. Cl. 83—2 **3 Claims**



1. A machine for simultaneously cutting and perforating vegetable segments which comprises a frame, revolvable impellers enclosed within an adjustable slotted casing, a stationary slicing knife in working relationship to the slot of said casing whereby, upon rotation of said impellers vegetables to be sliced will be centrifugally held against the inner wall of said casing and forced to travel across said slicing knife disposed transversely to said slot, means for receiving and discharging a slice of the vegetable as it passes through said slot into contact with a plurality of knives disposed in working relationship with said slot and operatively associated with said slicing knife for cutting the slice into a plurality of elongated strips of predetermined cross-section whose longest dimension is perpendicular to the path of travel of said slice, means for receiving and discharging said elongated strips into contact with an assembly of a plurality of circular and perforating knives adapted to simultaneously segment and perforate said elongated strips, and means for synchronizing the rotational velocity of said assembly with the linear velocity of said elongated strips and means for discharging the resultant segments, said perforating knives being adapted to produce holes in said segments extending from one third to comletely through said segments said knives being of a size and number such that the volume of said holes in each segment is in the range of 0.5 to 50% of the volume of each segment.

3,988,954

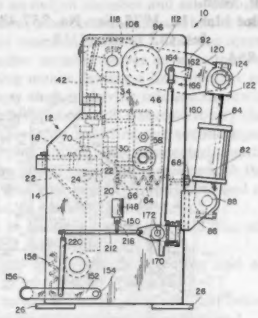
HEAVY DUTY SHEAR

Charles Kuchyt, R.R. No. 3, Box 118, Shelbyville, Ind. 46176

Division of Ser. No. 432,528, Jan. 11, 1974. This application Feb. 24, 1975, Ser. No. 552,434

Int. Cl.² B26D 5/12

U.S. Cl. 83—525 **1 Claim**



1. A shear comprising a frame, fixed blade means mounted on said frame, movable blade means cooperating with said fixed blade means to cut sheet material disposed therebetween, a fluid power cylinder for moving said movable blade means upwardly and downwardly past said fixed blade means, said power cylinder having an upwardly extending ram as a driver, and means for connecting said power cylinder to said movable blade means, said connecting means including lever means mounted on said frame for pivotal movement and providing oppositely extending lever portions, means for pivotally connecting said movable blade means to one of said lever portions, means for pivotally connecting said ram to the other of said lever portions, and means for controlling said power cylinder, said control means comprising a fluid valve having a movable valve control member with an extended position permitting fluid flow to extend said ram upwardly to move said movable blade means downwardly past said fixed blade means, a retracted position permitting fluid flow to retract said ram, and a neutral position between said extended and retracted positions, a main lever pivotally mounted upon said frame and providing first and second oppositely extending arm portions, a spring-returned foot pedal, an intermediate lever having one end pivotally connected to said first arm portion, an intermediate portion pivotally connected to said valve control member, and an opposite end pivotally connected to said foot pedal, means for controlling the pivotal movement of said main lever, said movement control means including a control rod pivotally connected to said other lever portion of said first named lever means, said control rod extending to intersect said second arm portion of said main lever, said control rod providing, adjacent said second arm portion, an enlarged portion having oppositely facing control surfaces transverse to the direction of extension of said control rod and, extending between said control surfaces, a guide surface, a pair of arms mounted upon said second arm portion for pivotal movement about axes parallel to the pivot axis for said main lever, each of said arms carrying, at its distal end, a roller rollably engaging said guide surface and the adjacent control surface, said rollers being effective, when both are engaging said guide surface, to prevent pivoting of said main lever, spring means for yieldably resisting separation of said arms, and stop means for preventing said arms from moving toward each other, said control rod being movable with said first named lever means relative to said second arm portion such that said main lever can pivot about its axis when one of said rollers moves from said guide surface onto one of said control surfaces.

3,988,955

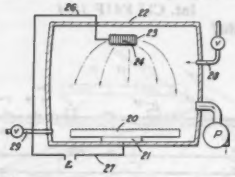
COATED STEEL PRODUCT AND PROCESS OF PRODUCING THE SAME

Niels N. Engel, 720 Gonzales Road, Santa Fe, N. Mex. 87501, and Eugene A. Anderson, 1594 Evans Drive S.W., Atlanta, Ga. 30310

Continuation-in-part of Ser. No. 424,672, Dec. 14, 1972, Pat. No. 3,925,116, which is a continuation-in-part of Ser. No. 279,244, Aug. 9, 1972, Pat. No. 3,915,757. This application Sept. 11, 1974, Ser. No. 505,148

Int. Cl.² C21D 1/10, 9/24; C23C 11/12

U.S. Cl. 83—661 13 Claims



1. A process of producing a cutting tool providing a hardenable steel tool with a cutting edge comprising, ion implanting a coating of a second metal into said cutting edge, reacting said second metal with a chemical to make a compound which is harder than the second metal and subjecting both the cutting edge and its coating to a magnetic flux generated by electrical induction for impulse hardening the same.

3,988,956

RECORDER

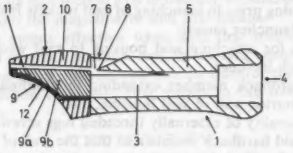
Hermann Moeck, Kreuzgarten 4, 31 Celle, Germany

Filed July 2, 1975, Ser. No. 592,387

Claims priority, application Germany, July 4, 1974, 2432423

Int. Cl.² G10D 7/00

U.S. Cl. 84—380 R 5 Claims



1. In a wind-instrument such as a recorder having a mouthpiece, a core disposed in the mouthpiece, a blowing duct in the mouthpiece, a lower wall face of the blowing duct being provided by the core, the improvement comprising forming at least that portion of the core which provides the lower wall face of the blowing duct from hardened plaster of paris.

3,988,957

DRUM PEDAL ASSEMBLY

Gus Escamilla, Dallas, Tex., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sept. 9, 1975, Ser. No. 611,832

Int. Cl.² G10D 13/00

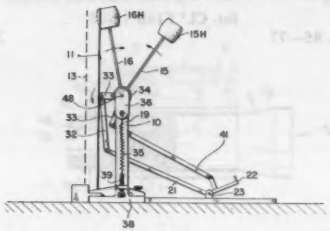
U.S. Cl. 84—422 R 2 Claims

1. A drum pedal assembly adaptable for mounting adjacent the face of a drum in which either of two drumsticks may be selectively employed to strike the drum face by the use of one pedal, comprising,

a frame adaptable for mounting adjacent the face of a drum,

two drumsticks each fixed to an individual collar rotatably mounted to the frame,

a pedal formed of a toe member and a heel member joined together by rotatable hinge means to the frame, linkage



means to join the toe pedal member to the periphery of the collar to which a first drumstick is fixed, linkage means to join the heel pedal member to the periphery of the collar to which the second drumstick is fixed and spring bias means to rotate the stick fastened to each collar away from the face of a drum adjacent the frame.

3,988,958

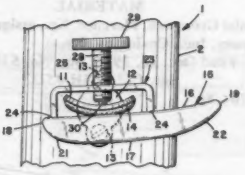
THUMB REST FOR A MUSICAL WIND INSTRUMENT

Darwin D. Brunkow, 871-66th Ave. NE., Minneapolis, Minn. 55433

Filed May 1, 1975, Ser. No. 573,755

Int. Cl.² G10D 3/18

U.S. Cl. 84—453 2 Claims



1. A thumb rest attachment for a wood-wind musical instrument, said instrument having a generally tubular body with a thumb rest fixed thereto, said attachment comprising:

a rigid body having an upper surface, a smooth bottom surface for overlying engagement with a user's thumb, and a curved side edge surface;

mounting means comprising an inverted, generally U-shaped bridge element secured to said upper surface in overlying relationship thereto and defining therewith a thumb rest receiving opening, and a clamping element threaded into the bight of said bridge element, said clamping element and said upper surface cooperating to mount said attachment to said fixed thumb rest when it is received in said opening;

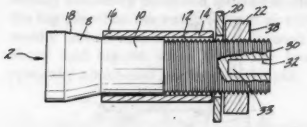
said bottom surface being elongated in a direction generally tangentially with respect to said tubular body when mounted on said fixed thumb rest, said bottom surface having a length considerably longer than the width of said fixed thumb rest, and said bottom surface being generally flat for the greater part of said length and being curved upwardly adjacent the longitudinally opposite ends thereof; and

said curved inner side edge surface being disposed to generally follow the cross-sectional curvature of said tubular body when said attachment is mounted on said fixed thumb rest.

3,988,959
BOLT IDENTIFICATION SYSTEM

David Henry Buchanan, Victoria, Australia, assignor to Olin Corporation, New Haven, Conn.

Filed Mar. 11, 1974, Ser. No. 450,117
Claims priority, application Australia, Mar. 9, 1973, 2531/73
Int. Cl.² F16B 13/06
U.S. Cl. 85—77 3 Claims

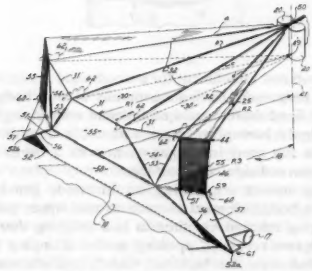


1. An identification system for anchor bolt assemblies of the type including a bolt member having a sleeve expanding portion at one end and expandable sleeve means on said bolt member adjacent said sleeve expanding portion for being expanded when the bolt member is moved relative to said expandable sleeve means so that the sleeve expanding portion enters said sleeve means, said system including a plurality of anchor bolt assemblies having bolt members of different lengths, each bolt member having a bore in its end wall opposite the sleeve expanding portion, the diameter of said bore being the smallest for the largest bolt member of the system and being progressively increased for each decrease in length of a bolt with said shortest bolt having a recess of greatest diameter.

3,988,960
METHOD AND APPARATUS FOR FAN FOLDING SHEET MATERIAL

Joseph Daniel Greenwell, Florence, Ky., assignor to R. A. Jones & Company, Inc., Covington, Ky.

Filed Dec. 23, 1974, Ser. No. 535,440
Int. Cl.² B65H 45/22
U.S. Cl. 270—86 9 Claims



1. The method of fan folding a planar web moving along a path downstream to a nip while progressively and simultaneously forming upper and lower creases in said web, said method comprising the steps of,

providing a nip defining a nip line,

guiding said web over the sides of a portion of a first polygon, said sides circumscribing a circle lying in a first plane perpendicular to said nip line whose center is on said nip line, and

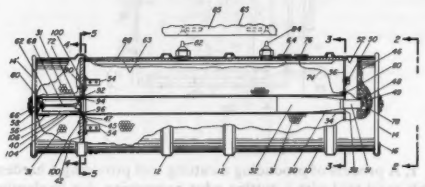
upstream of said portion of said first polygon, progressively guiding said web over the sides of portions of a plurality of polygons spaced from said first polygon, the sides of said polygons circumscribing circles lying in spaced planes parallel to said first plane and to each other whose centers lie on said nip line,

each upstream polygon having fewer sides than its adjacent polygon.

3,988,961
INTEGRATED ROCKET SHIPPING CONTAINER AND LAUNCHER

Charles C. Banta, Hamburg, N.J., and Carl R. Chambers, Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 8, 1975, Ser. No. 603,209
Int. Cl.² F41F 3/04
U.S. Cl. 89—1.807 5 Claims



1. A munition for use on a weapon carrier which comprises:

a plurality of rockets each having aft ends and nose ends;

an ignition squib operatively disposed in each aft end of said plurality of rockets;

a fuze operatively positioned in each nose end of said plurality of rockets;

a container-launcher means for safely holding said plurality of rockets therein during transportation of said plurality of rockets and said container-launcher means to said weapons carrier, and for providing initiation, arming and guidance to said plurality of rockets during launching which includes;

a hollow tubularly shaped housing having a forward end and an aft end;

releasable cover means for protecting said plurality of rockets during transportation and for allowing easy removal of said cover means from the forward and aft ends of said housing prior to launching of said rockets from said counter-launcher means;

means for attaching said housing to said weapons carrier which includes;

a hardback member extending longitudinally along an interior wall of said housing; and

a plurality of externally threaded lugs screwedly fixed to said hardback member so that the wall of said housing is fixedly held therebetween, wherein said lugs readily mate with and lock into said weapons carrier;

means for electrically arming and initiating said plurality of rockets;

a first multi-pin electrical connector threadedly fixed to said hardback member;

a second multi-pin electrical connector threadedly fixed to said hardback member;

means for electrically connecting said first multi-pin connector to said ignition squibs and for electrically connecting said second multi-pin connector to said fuzes located in the nose ends of said plurality of rockets;

a plurality of rocket launching tubes longitudinally disposed in said housing;

means for detenting said plurality of rockets within said launching tubes;

baffle means for uniformly spacing said launching tubes within said housing and for shielding said launching tubes from the blast effect of said plurality of rockets when they exit from said launching tubes; and

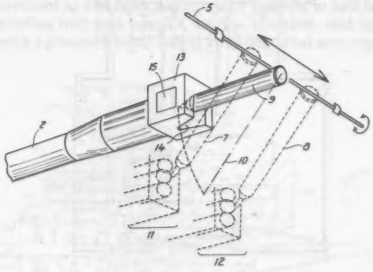
means for compliantly holding said launching tubes within said housing to protect said plurality of rockets from the forces of shock and vibration during the transportation of said plurality of rockets by said weapons carrier.

3,988,962

LOADING PENDULUM

Tore Elwin, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden

Filed Dec. 2, 1974, Ser. No. 528,615
Claims priority, application Sweden, Dec. 5, 1973, 7316391
Int. Cl.² F41H 7/06
U.S. Cl. 89—46 **9 Claims**



1. Apparatus for the loading of rounds of ammunition from at least one magazine into the barrel of a firearm which is movable in elevation about a first axis comprising:

first means rotatable about a second axis parallel to said first axis and also movable translationally along said second axis,

second means for rotating said first means between first and second angular positions about said second axis,

third means for translationally moving said first means along said second axis between at least first and second spaced locations,

fourth means effective only when said first means is in its first said angular position and in its first said spaced location along said second axis to transfer a round of ammunition from the magazine to said first means,

and fifth means effective when said first means is in its second angular position and in its said second spaced location along said second axis to transfer the round of ammunition from said first means to the barrel of the firearm.

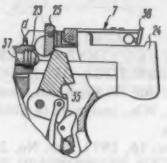
3,988,963

SAFETY DEVICE WHICH ARRESTS THE HAMMER AND BLOCKS THE SIGHT

Efim Leontievich Khaidurov, ulitsa Glagoleva, 25, korpus 2, kv. 138, Moscow; Vladimir Alexandrovich Razorenov, ulitsa Ponomareva, 4a, kv. 51, Minsk; Sergei Sergeevich Bulanov, ulitsa Pushkinskaya, 204, kv. 28, and Oleg Mikhailovich Gorbov, ulitsa Kirova, 118, kv. 4, both of Izhevsk, all of U.S.S.R.

Filed June 24, 1974, Ser. No. 482,599
Int. Cl.² F41C 17/04
U.S. Cl. 89—148 **6 Claims**

1. A self-loading match pistol comprising: a frame; a barrel supported by said frame and having a bore; a slide adapted to close off the bore of said barrel and supported by said frame for reciprocation therealong; a firing and trigger mechanism mounted on said frame; a base supported by said frame; a sighting device mounted on said base; one guideway on said frame for said slide for reciprocation therealong during firing and including two bearing surfaces parallel to the bore of said barrel and cooperating with the surface of said slide at the underside thereof during reciprocation of said slide; a second guideway for said slide for reciprocation therealong during firing, positioned above said slide and releasably connected with said base so as to be removable when the pistol is taken apart; said second guideway including a plate having one bearing surface cooperating with the surface of said slide at the top thereof; said base having a channel corresponding to



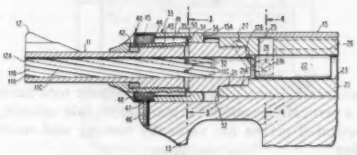
the shape of said slide, said plate being pivotably mounted on said base for movement between a raised position and a lowered position, said plate in the lowered position being operative to guide the top surface of the slide, said plate in the raised position blocking viewing through said sighting device and preventing operation of said firing and triggering mechanism.

3,988,964

GAS OPERATED FIREARM WITH METERING ADJUSTMENT

Wildey J. Moore, Box 578, Rte. 94, R.D. 4, Newburgh, N.Y. 12550

Filed Apr. 25, 1974, Ser. No. 463,849
Int. Cl.² F41D 5/08
U.S. Cl. 89—185 **9 Claims**



1. A gas operated firearm capable of at least semi-automatic operation; said firearm comprising: a receiver including a barrel; a slide mounted for reciprocation on said receiver; a breech bolt mounted for reciprocation in said receiver; means coupling said bolt to said slide so that reciprocation of said slide effects reciprocation of said bolt; a plurality of radially extending ports in said barrel, an annular piston surrounding and mounted for reciprocation on said barrel, said piston including a head portion and a skirt portion extending forwardly from said head portion, said head portion being in abutment with said slide and slidable along said barrel; an annular gas flow adjuster surrounding said barrel and mounted on said barrel for movement axially therealong to any one of a plurality of different positions of adjustment relative to said barrel, said adjuster including a cylindrical sleeve slidably surrounded by said piston skirt portion, said adjuster sleeve, said head portion of said piston, and said skirt portion of said piston defining an annular gas chamber in registry with said ports, said adjuster sleeve having a rearwardly facing annular end surface defining the forward wall of said gas chamber and said head portion of said piston having a forwardly facing annular surface defining the rear wall of said gas chamber, coengageable stop means on said adjuster sleeve and on said piston for limiting forward movement of said piston relative to said adjuster to a point at which said rearwardly facing annular surface of said adjuster sleeve is spaced from said forwardly facing annular surface of said piston head portion and said

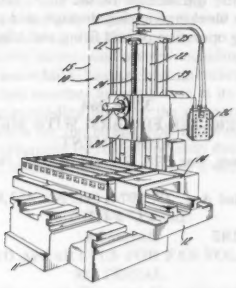
adjuster sleeve having a rear end portion located adjacent said ports and which rear end portion in said different positions of adjustment of said adjuster covers different amounts of the radially outer ends of said ports to provide different degrees of restriction in the flow path of gas from the bore of said barrel to said gas chamber; and detent means for releasably holding said adjuster in any selected one of said positions of adjustment.

3,988,965

TWO PRESSURE COUNTERBALANCE SYSTEM FOR MACHINE TOOL HEADSTOCKS

Donald J. Cayen; Orville W. Ehrhardt, and Richard V. Fatke, all of Fond du Lac, Wis., assignors to Giddings & Lewis, Inc., Fond du Lac, Wis.

Filed Dec. 16, 1971, Ser. No. 208,854
Int. Cl.² B23C *1/02*
U.S. Cl. 90—11 F **11 Claims**



1. A counterbalance system for a machine tool having a column, a vertically positionable member on said column, and power operated means for vertically moving said member, comprising

a cylinder and a piston, one of which is movable and relative to the other,

means connecting said member to the movable one of said piston and cylinder so that the latter is movable in opposite directions upon movement of said member in opposite directions,

said connecting means exerting a counterbalance force on said member when pressurized fluid is supplied to said cylinder,

said counterbalance system incurring a predetermined frictional resistance force which opposes downward movement of said member as said member is lowered and which opposes movement of the movable one of said cylinder and piston as said member is being raised,

means for automatically supplying and maintaining a predetermined relatively high fluid pressure in said cylinder when said member is being raised so that said connecting means exerts a predetermined net counterbalance force on said member,

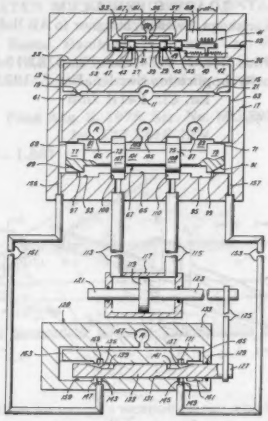
and means for automatically maintaining a predetermined lower fluid pressure in said cylinder when said member is being lowered so that the differential force resulting from said high and low fluid pressures compensates for the frictional resistance force incurred by the counterbalance system and causes said connecting means to exert substantially the same net counterbalance force on said member when said member is being lowered as is exerted when said member is being raised.

3,988,966

FLUIDIC REPEATER

Willie Burt Leonard, 5902 Royalton, Houston, Tex. 77036

Filed July 18, 1974, Ser. No. 489,829
Int. Cl.² F15B *13/16*
U.S. Cl. 91—388 **11 Claims**



1. Fluidic repeater comprising

transmitter means adapted for connection to a source of pressure fluid and having an output adapted to deliver pressure fluid at variable pressure according to the setting of the transmitter,

responder means comprising a piston and cylinder connected to the output of the transmitter for relative axial movement of the piston and cylinder in response to variation in the pressure of the transmitter output,

said transmitter comprising:

a. a pair of fluid passages each adapted at a certain location for connection to source of pressure fluid having a drooping pressure versus rate of flow characteristic, and

b. venting means for said fluid passages comprising an opening in each passage downstream from said location relative to said source adapted for connection to a fluid reservoir of lower pressure then said source and obstructor means for varying the degree of venting of said fluid passages through said openings,

said openings of said fluid passages being side ports in a vent cylinder and said obstructor means comprising a spool disposed in the vent cylinder having land means for variably covering said ports in accordance with the axial position of the spool,

said output of the transmitter being provided by said fluid passages, said axial movement of the responder means piston being in response to pressure difference in said fluid passages, and

feedback means actuated by said responder means for variably venting the output of said transmitter to negate pressure change created by change of setting of the transmitter.

3,988,967

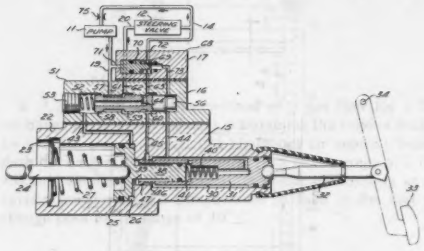
BRAKE BOOSTER WITH HYDRAULIC RATIO CHANGER

Edward S. Orzel, Cleveland, Ohio, assignor to The Weatherhead Company, Cleveland, Ohio

Filed July 10, 1975, Ser. No. 594,804
Int. Cl.² F15B *13/10*
U.S. Cl. 91—391 R **19 Claims**

1. In a motor vehicle, a fluid power circuit comprising a pump having an inlet side and an outlet side, a control valve, a steering valve having an inlet side and an outlet side, a brake

booster, and conduit means hydraulically connecting said pump and control valve and steering valve and brake booster; said control valve including a control spool slidably disposed in a bore and having opposite end faces, valve means on said control spool controlling fluid pressure communication between said pump outlet side and said brake booster and between said pump outlet side and said steering valve inlet side; said brake booster including a housing having a bore extending therethrough, a power piston slidably disposed in said bore, a power chamber in said bore on one side of said power piston, a trapped volume chamber in said bore, an output rod on said one side of said power piston extending into said trapped volume chamber and having a predetermined lateral cross-sectional area exposed to the fluid pressure level in said trapped volume chamber, an input rod slidably disposed for movement to and from a deactuated position in said bore and extending into said trapped volume chamber, said input rod having a predetermined lateral cross-sectional area exposed to



the fluid pressure level in said trapped volume chamber, said input rod area being substantially greater than said output rod area and being constructed and arranged such that movement of said input rod in said trapped volume chamber results in proportional but larger movement of said output rod when the volume of fluid in said trapped volume chamber remains substantially constant, a brake pedal operatively connected to said input rod for moving said input rod in said trapped volume chamber, a passage in said brake booster, said conduit means including means establishing open fluid pressure communication between said passage and said outlet side of said steering valve under all conditions, said passage opening into said bore at a predetermined location, and said input rod including valving surface means constructed and arranged to block said passage when said input rod is actuated and to establish open fluid pressure communication between said passage and said trapped volume chamber when said input rod is deactuated.

3,988,968

STOP TUBE FOR CYLINDER ASSEMBLIES

Walter C. Peters, Elk Grove Village; Raymond L. Ghislain, Elmhurst, and Francis S. Flick, Oakbrook, all of Ill., assignors to Miller Fluid Power Corporation, Bensenville, Ill.

Filed Dec. 23, 1974, Ser. No. 535,277

Int. Cl.² F01B *11/02;* **F16J** *15/18*

U.S. Cl. 92—85 A **6 Claims**

1. In a fluid actuated cylinder, the combination comprising:

a cylinder having an internal bore;

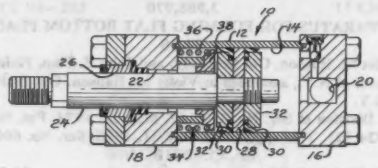
means defining a pair of cylinder heads, each at a respective end of said cylinder and closing the associated end of said bore;

a piston received in said bore for reciprocal movement therein;

a piston rod secured to said piston and having at least one end emerging from said bore through one of said heads;

a stop tube having an interior slightly larger than said rod and freely slidably received on said rod and interposed between said piston and the head through which said rod emerges from said bore for engaging said head and said piston to limit movement of said piston toward the head through which said rod emerges from said bore;

a coil spring about said rod within said bore, said stop tube including a radially outwardly extending flange in non-



sealing relation to said internal bore, said spring having one end abutting said flange, an intermediate portion surrounding said stop tube and its other end abutting one of said heads and said piston.

3,988,969

ROTARY HYDRAULIC JACK

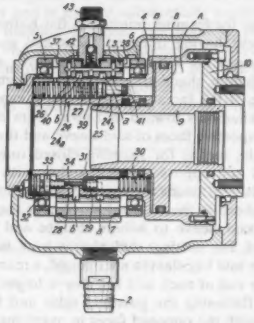
Jean Lioux, Rueil-Malmaison, France, assignor to La Precision Industrielle, Rueil-Malmaison, France

Filed Apr. 9, 1974, Ser. No. 459,279

Claims priority, application France, Apr. 13, 1973, 73.13434

Int. Cl.² F01B *31/10;* **F15B** *13/042, 21/04*

U.S. Cl. 91—420 **6 Claims**



1. A rotary hydraulic double acting jack comprising a cylinder, a piston slidably mounted in said cylinder to define therein two compartments, a rotary hydraulic joint connected to an hydraulic liquid supply for the supply of hydraulic liquid to and the evacuation of hydraulic liquid from at least one of said compartments, which hydraulic joint comprises a fixed, hollow cylindrical part and a rotary part including said cylinder and bearings supporting said rotary part in said fixed part with a narrow annular gap between said rotary and fixed parts, a passageway leading to said one compartment and having a portion in each of said fixed and rotary parts open to said gap, the passageway portion in the rotary part being equipped with at least one liquid flow operated non-return device adapted for admitting a flow of hydraulic liquid only in the direction to said one compartment, flow responsive means operated by hydraulic liquid in the other compartment for opening said non-return device, at least one first groove provided in at least one of said parts and communicating with said passageway portions in said fixed and rotary parts, means for placing said gap and first groove into communication with the atmosphere after the feeding of hydraulic liquid under pressure to said one compartment of the jack cylinder, and means connected to said annular gap for supplying gas under pressure to said annular gap for the purpose of expelling residual hydraulic

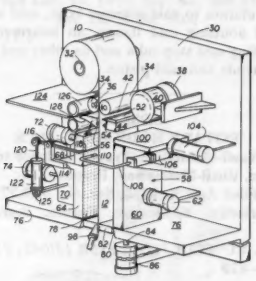
liquid from said gap after the supply of hydraulic liquid under pressure to said one compartment via said passageway and said non-return device has been completed.

3,988,970

APPARATUS FOR FORMING FLAT BOTTOM PLASTIC BAGS

Violet M. Hanson, Old Bethpage, and John E. Finn, Plainview, both of N.Y., assignors to Violet M. Hanson, Old Bethpage, N.Y.

Division of Ser. No. 472,167, May 22, 1974, Pat. No. 3,924,521. This application July 31, 1975, Ser. No. 600,737
Int. Cl.² B31B *33/00*
U.S. Cl. 93—14 **20 Claims**



1. Apparatus for forming reinforced flat bottom bags from a tubular sleeve having opposed faces and gusseted sides, comprising means for supporting said sleeve, a plurality of foraminous plenum chambers, one of said chambers located adjacent each of the faces of said sleeve, means for moving said plenum chambers toward and away from each other to engage the respective faces of said sleeve and thereafter movable outwardly, means for seaming closed one end of said sleeve to seal said opposed faces together with the gusseted sides therebetween, means for applying a vacuum through said plenum chambers on the outward movement thereof to cause the faces of said sleeve to adhere thereto and to open said sleeve, means for cutting said sleeve into individual bag sleeves before said bag sleeves are opened, a mandrel movable into the other end of each said bag sleeve to press against the seamed end flattening the gusseted sides and forming flaps having folds with the opposed faces in overlying relationship, and means for securing selected portions of said flaps and said overlying sides and faces to form a reinforced bottom.

3,988,971

METHOD OF MAKING ENVELOPE ASSEMBLY

Donald J. Steidinger, Barrington, Ill., assignor to Wallace Business Forms, Inc., Hillside, Ill.

Continuation-in-part of Ser. No. 366,153, June 1, 1973, abandoned. This application June 18, 1975, Ser. No. 587,990
Int. Cl.² B31B *1/16*
U.S. Cl. 93—63 M **2 Claims**

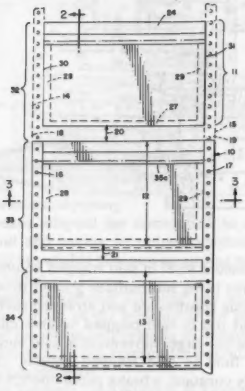
1. A method of making a return envelope for a stuffed sealed mailer comprising:

advancing an elongated web having a pair of margins at least one of which is defined by a longitudinally extending line of potential trimming with said one margin being equipped with longitudinally spaced, aligned line holes and defining a connected series of front panels between said margins, the major portion of each front panel ultimately constituting the envelope front and flap parts of said return envelope, said flap part being defined relative to said front part by a transversely extending line of potential folding, said flap part ultimately providing one transversely extending edge of said return envelope upon detachment thereof from said web, said envelope front part providing the other transversely extending edge of said detached return envelope, said transversely extending edge of said flap part of a given return envelope being spaced from the transversely extending edge of the envelope front part of an adjacent return envelope,

applying a transversely extending band of adhesive to each flap part and front part, the band of adhesive applied to said flap part being adjacent said one transversely extending edge, the band of adhesive applied to said front part being adjacent said other transversely extending edge,

applying a pair of longitudinally extending bands of adhesive to said front part adjacent said margins,

applying a generally rectangular back panel to each front panel at least the major portion of each back panel constituting the envelope back part, said back panel having longitudinally extending edges generally aligned with said lines of potential trimming with a portion of said back



panel adjacent said longitudinally extending edges being secured to said front panel by said longitudinally extending bands of adhesive, said back panel having transversely extending edges, one of said transversely extending edges in each back panel being positioned adjacent said line of potential folding of the associated front panel and unsecured to said front panel, a portion of said back panel adjacent the other said transversely extending edges in said back panel being secured to said front panel by said transversely extending band of adhesive applied to said front part, and

completely transversely severing said web by removing a transversely extending strip from each front panel between the transversely extending band of adhesive in one return envelope front part and the transversely extending band of adhesive in the adjacent envelope flap part to provide a series of return envelopes for subsequent installation of said return envelopes in a series of connected larger envelope assemblies.

3,988,972

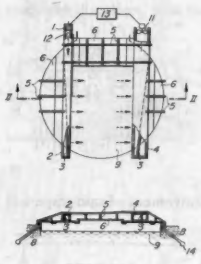
GAS SHIELDING METHOD FOR A FUEL EXCHANGE POOL AND AN APPARATUS THEREFOR

Hiroshi Goto; Toshiharu Arai, both of Hitachi; Tadao Sekiguchi, Tokyo, and Hideo Hara, Sagamihara, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 15, 1975, Ser. No. 541,116
Int. Cl.² F24F *9/00*
U.S. Cl. 98—36 **6 Claims**

2. In a push-pull type shielding method of a gas flow, a gas shielding method for a fuel exchange pool which is characterized in that ratio of sucked air quantity into a pull duct to

blown-out air quantity from a push duct above the fuel pool is maintained in the range of 2.0 – 4.0, and a temperature difference between water in the fuel pool and the shielding air is retained less than 30° C.



6. A push-pull shielding method of a gas flow for a fuel exchange pool, which includes maintaining the ratio of sucked air quantity into a pull duct to blown-out air quantity from a push duct above the fuel exchange pool in the range of 2.0 to 4.0, and retaining the temperature of the air forming an air curtain lower than the temperature of fluid in the fuel exchange pool in the range of 30° C.

3,988,973

AIR OUTLET

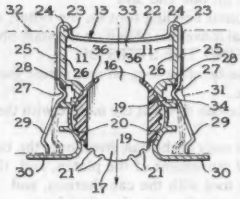
Winfried Hönmann, Stuttgart, Germany, assignor to LTG Lufttechnische GmbH, Stuttgart, Germany

Filed Nov. 29, 1974, Ser. No. 528,445

Claims priority, application Germany, June 24, 1974, 2430216

Int. Cl.² F24F *13/06*

U.S. Cl. 98—40 C **16 Claims**



1. An air inlet means through which supply air is blown into the room of a building or the like for controlling the occurrence of the Coanda effect comprising, an elongated body having spaced walls which define a first air region and a second region lying parallel thereto and coextensive with said first air region, said second region having an inlet opening into said first air region and a longitudinally extending outlet area, a plurality of axially aligned air control means mounted and supported in said second region, each air control means having side walls which define an air passageway having an inlet opening and an outlet opening through which air from said first air region to a zone lying beyond said outlet area, wherein the width of said passageway at said outlet opening is approximately equal to the width of said longitudinally extending outlet area.

3,988,974

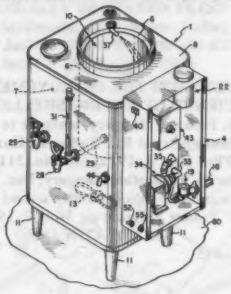
INSTANT COFFEE BREWER

Murray Kaplan, 66 Wooleys Lane, Great Neck, N.Y. 11023

Filed May 13, 1975, Ser. No. 577,095

Int. Cl.² A47J *31/00*

U.S. Cl. 99—285 **11 Claims**



1. A coffee brewer for instant coffee comprising:
a water-heating chamber;
a heating element positioned proximate said heating chamber for heating water in said chamber;
a brewing chamber;
a nozzle associated with said brewing chamber, said nozzle being positioned near the top of the wall of said brewing chamber and in a plane substantially parallel to said wall of said brewing chamber and pointing partially downwardly and partially horizontally to create a swirling movement of water entering said brewing chamber; and
means for transferring a predetermined amount of water from said heating chamber to said brewing chamber nozzle.

3,988,975

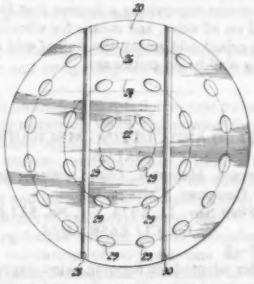
COOKING UTENSIL HAVING BOIL-CONTROL MEMBER

Edward J. Buter, 160 Shoreline East, Point Sanilac, Mich. 48469

Filed Sept. 18, 1975, Ser. No. 611,212

Int. Cl.² A47J *37/12*

U.S. Cl. 99—415 **5 Claims**



1. A combination comprising:
a cooking utensil having a substantially planar base and an upstanding sidewall connected to the base to form a container for cooking a liquid;
a liquid disposed in the container, the liquid being capable of boiling when exposed to heat, and having such a depth in the container as to be suited for boiling over the top edge of the sidewall; and

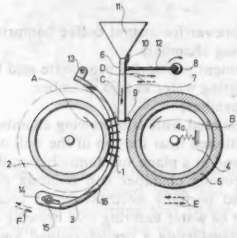
a thin, substantially planar boil-control member disposed in said liquid on the base of the cooking utensil in a substantially face-to-face relationship with the base, said boil-control member having a perimetric edge disposed in substantially the same plane as the mid-section of said member and a pattern of perforations so formed as to prevent the liquid from boiling over the top edge of the utensil sidewall at the time that the utensil base is exposed to heat.

3,988,976

EQUIPMENT FOR THE IMPROVEMENT OF THE EFFICIENCY OF DRYING SHELLED MAIZE

Istvan Slezak, Perkata, Hungary, assignor to Intercooperation Kereskedelemfejlesztesi Rt., Budapest, Hungary

Filed Dec. 4, 1972, Ser. No. 311,450
Claims priority, application Hungary, Dec. 3, 1971, SE 1598
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976
Int. Cl.² A23N *1/02*
U.S. Cl. 99—485 **3 Claims**



1. Equipment for drying grains of shelled maize, comprising a pair of cylinders rotating in opposite directions about parallel axes, a multiplicity of needles extending radially outwardly from the cylindrical surface of one said cylinder toward but spaced from the cylindrical surface of the other said cylinder, the surface of said other cylinder being resilient, a stripping comb for removing grains of maize from said needles, and means for orienting grains of shelled maize so that their flat sides are substantially parallel to said axes and for feeding thus oriented grains of maize between said cylinders, said orienting and feeding means comprising a hopper that feeds to a chute that is closed on all sides, and means for vibrating one wall of said chute to orient said grains, the wall of said chute opposite said vibrating wall being stationary.

3,988,977

TWINE FEED AND CUTTING MECHANISM FOR A BALER

Walter Anderson, Memphis, Tenn., assignor to International Harvester Company, Chicago, Ill.

Filed Nov. 11, 1974, Ser. No. 522,671
Int. Cl.² B65B *13/18*
U.S. Cl. 100—5 **11 Claims**

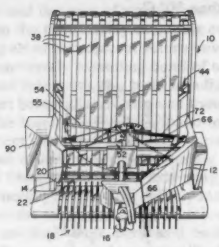
1. In a baler adapted for forming twine-wrapped cylindrical bales, an improved twine-dispensing and cutting mechanism, comprising:

a twine dispenser pivotally mounted on the baler and having a dispensing end swingable to and from a home position wherein the twine depends downwardly therefrom;

a knife mounted on the baler proximate to the twine depending from said dispensing end when in said home position;

a twine engaging element pivotally mounted on the baler for pulling the twine against said knife to cut the same;

and means linking said twine dispenser and said element for pivoting said element to effect cutting of the twine in



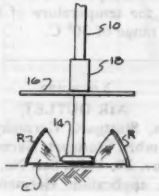
response to movement of said dispenser to its home position.

3,988,978

BEVERAGE CAN FOLDER

Joseph J. Flick, Amarillo, Tex., assignor to Oliver W. Bivins, Amarillo, Tex., a part interest

Filed May 30, 1975, Ser. No. 582,235
Int. Cl.² B30B *13/00, 1/04, 9/32*
U.S. Cl. 100—35 **7 Claims**



1. The method of flattening and picking up empty beverage cans on a surface with a tool having

a. an upright stalk with

i. a handle on one end and

ii. a horizontal bending foot on the other, and

b. a horizontal moveable platen on the stalk above the foot,

c. COMPRISING THE STEPS OF:

d. placing the bending foot on and across the can at about the middle,

e. bending the can down at the middle with the bending foot and

f. folding the ends of the can down over the bending foot by downward movement of the platen, and, then,

g. lifting the tool with the can thereon, and

h. sliding the can from the bending foot.

3,988,979

FRONT END LOADER

Fred T. Smith, Newark, Ohio, assignor to Sargent Industries, Inc., Los Angeles, Calif.

Filed Aug. 12, 1974, Ser. No. 497,129
Int. Cl.² B30B *15/16, 15/06;* **B60P** *1/00*
U.S. Cl. 100—50 **70 Claims**

1. A refuse compactor comprising:

a refuse storage body having a rear wall, a front wall, a bottom wall and side walls defining an enclosure;

a compaction panel movable in a rearward direction within said storage body to give refuse within said storage body an initial pack of a first particular maximum pressure against the rear wall of the storage body;

at least on stuffer panel defining a portion of the compaction panel in a first position and movable within said body

relative to said compaction panel in a rearward direction to a second position to give the refuse in said body a secondary pack, of a second particular maximum pressure greater than the first particular maximum pressure, against the rear wall of the storage body, and

control means operatively coupled to said compaction panel and said stuffer panel to move said compaction panel in the rearward direction, with the stuffer panel in

the first position, until the production of the first particular maximum pressure against the compaction panel and then to move said stuffer panel between the first and second positions, with the compaction panel stationary, until the production of the second particular maximum pressure against the compaction panel and then to move the compaction panel from the stationary position with the stuffer panel in the first position.

3,988,980

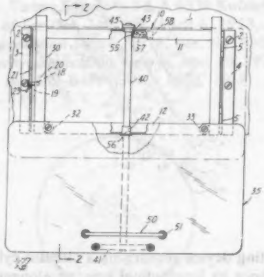
SAFETY GUARD STRUCTURE

Brooks Walker, 807 Francisco St., San Francisco, Calif. 94109

Filed Aug. 29, 1975, Ser. No. 608,922

Int. Cl.² B30B *15/00*

U.S. Cl. 100—53 **4 Claims**



1. A safety guard structure adapted to be interposed at an area between a mechanism and an operator spaced from said mechanism for protecting said operator, comprising:

a generally rectangular planar generally vertically disposed guard member having a lower position registering with said area

a pair of vertically elongated horizontally spaced apart parallel guides above said area

one pair only of rollers mounted on said member adjacent its upper edge and in rolling engagement with said guides,

a single vertically extending rod positioned intermediate said guides and secured at its lower end to said guard member,

a pair of vertically spaced fixed bearings above said area and in which said single rod is slidably received, whereby said guard member may be moved from an upper position spaced upwardly from said area to a lower position covering said area and spaced downwardly from said guides and bearings.

3,988,981

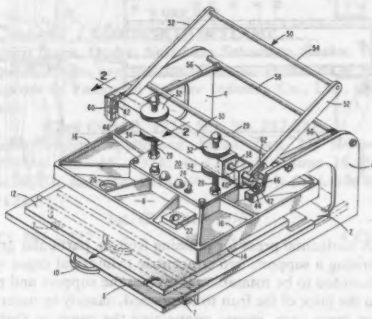
MANUALLY OPERATED PRESS

Charles Douglas McDonald, 2522 Butler, Dallas, Tex. 75235

Filed Jan. 23, 1976, Ser. No. 651,627

Int. Cl.² B30B *1/04, 15/34*

U.S. Cl. 100—99 **7 Claims**



1. A press including a base, a platen generally opposed to and acting against said base, and a frame attached to said base and carrying means for supporting and actuating said platen toward and away from said base, said platen supporting and actuating means comprising in combination:

a pressure bar extending transversely of said press and spaced above said platen;

at least one platen support member joining said platen and said pressure bar;

at least one radius arm extending longitudinally of said press from said pressure bar to an articulated attachment to said frame, whereby movement of said pressure bar describes a generally arcuate path defined by the radius arm; and

pressure bar actuating means joining said pressure bar to said frame and comprising for each end of said pressure bar

a first shaft journaled for rotation in said pressure bar and extending outwardly of an end portion thereof,

a second shaft affixed to said first shaft, adjacent and parallel thereto, and journaled within a horizontally elongated slot in said press frame for rotation about its own axis and for movement transversely of its axis and longitudinally of said press frame, and

an actuating handle affixed to and extending generally radially outwardly of at least one of said shafts, whereby selective arcuate movement of said handle serves to rotate said shafts in their respective journals with each first shaft and the pressure bar journaled thereto rotating about its respective second shaft and each second shaft rotating and moving within its respective slot, thus causing movement of the platen selectively toward or away from the base to exert and release pressure between the base and the platen, the radii of the first and second shafts defining the maximum travel of the platen toward and away from the base.

3,988,982

HORIZONTAL PRESS

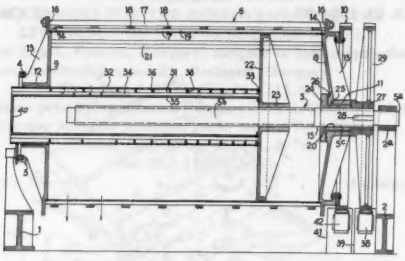
Charles Henri Gall, Pineuilh, 33220 Sainte Foy la Grande, France

Filed May 29, 1975, Ser. No. 582,408

Claims priority, application France, May 30, 1974, 74.18829

Int. Cl.² B30B *9/06, 9/08*

U.S. Cl. 100—107 **12 Claims**



1. A horizontal press for pressing fruit, in particular grapes, comprising a support, two concentric cylindrical cages which are mounted to be rotatable relative to the support and pervious to the juice of the fruit to be pressed, namely an outer cage and an inner cage, means connecting the cages so that they can rotate together, a first plate movable in translation, means connecting the movable plate to the two cages so that it is rotatable with the cages, a second plate which is fixed in translation relative to the support and disposed adjacent an end of the cages opposed to the first plate, the two plates and the two cages defining an annular volume for receiving the fruit to be pressed, a centre screw mounted to be rotatable relative to the support on which screw there is journalled an end of the outer cage opposite the fixed plate, the first plate having a hub screwthreadedly engaged on the screw, the inner cage being integral with the first plate and extending through the second plate, and two independent driving means respectively for driving the screw and for driving both cages.

3,988,983

TRANSFER MACHINE AND SYSTEM

Nobuo Matsumoto, Kurashiki; Yoshio Yoshimoto, Okayama; Tsutomu Miyake, Kurashiki, and Gumpei Yokoyama, Kobe, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha and Kawasaki Steel Corporation, both of Kobe, Japan

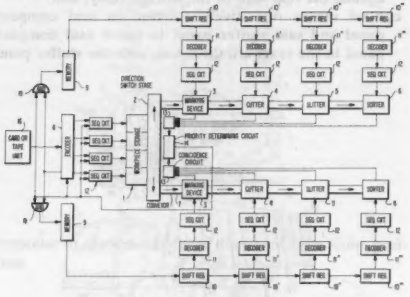
Continuation-in-part of Ser. No. 398,903, Sept. 19, 1973, abandoned. This application June 18, 1975, Ser. No. 588,107

Claims priority, application Japan, Sept. 25, 1972, 47-96357

Int. Cl.² B41F *19/00;* B41K *3/68;* B26D *7/06*

U.S. Cl. 101—35 **3 Claims**

1. A transfer machine system comprising a first line having a marking device, a lateral cutting device, a longitudinal slitting device, and a sorting device arranged at predetermined equal intervals on a conveyor, means responsive to the operation of each of said devices for intermittently advancing said conveyor by the distance corresponding to said intervals, means for supplying a sample steel plate on said conveyor each time said conveyor is intermittently advanced, and means controlling the operations of said devices so that the sample steel plate is mareked, cut and sorted according to a predetermined pattern and at least a second duplicate line of marking, lateral cutting longitudinal cutting and sorting devices arranged at predetermined equal intervals on at least a second conveyor, wherein said means for intermittently advancing said conveyor in said first line also intermittently advances at least said second conveyor on the basis of priority



given the line where all operations have been completed by each device on the line subsequent to the last advance.

3,988,984

PRINTING DEVICE COMPRISING A DISTANCE ROLLER

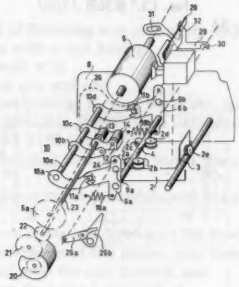
Ernst Claes Goran Lindelöv, and Björn Sven Hilding Eriksson, both of Jarfalla, Sweden, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,091

Claims priority, application Sweden, Nov. 6, 1974, 74138892

Int. Cl.² B41J *9/26*

U.S. Cl. 101—93.03 **6 Claims**



1. A printing device comprising a circular cylindrical anvil rotatable about its longitudinal axis, an elongated guide rod mounted parallel to said longitudinal axis, a printing head disposed opposite said anvil and mounted for displacement along said guide rod, a shaft mounted parallel to said longitudinal axis, a distance roller mounted for rotation about said shaft, spring means for biasing said roller against said anvil, and means for displacing said printing head perpendicular to said longitudinal axis responsive to movement of said distance roller with respect to said anvil, wherein said means for displacing comprises pivot means for mounting said guide rod for motion with respect to said longitudinal axis, said pivot means comprising at least two arms mounted for pivotal movement about an axis parallel to said longitudinal axis, and link means for pivoting said arms in response to the position of said distance roller with respect to said longitudinal axis.

3,988,985

SQUEEGEE DRIVE FOR ENDLESS SCREEN PRINTING MACHINE

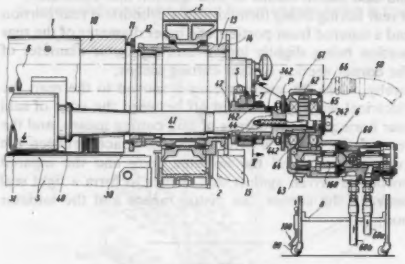
Mathias Mitter, Verl-Sende-Mitte, Germany, assignor to Mitter & Co., Schloss Holte, Germany

Filed June 19, 1974, Ser. No. 479,911

Claims priority, application Germany, June 20, 1973, 2331358

Int. Cl.² B41F *15/42*, *15/46*

U.S. Cl. 101—119 25 Claims



1. In a screen printing machine, the combination of an endless stencil; first means for moving said stencil; a liquid applying roll located within said stencil and having a shaft projecting outwardly therefrom; second means comprising a drive unit mounted on and engaging said shaft outside said stencil for rotating said roll, said second means being entirely separate from and independent of said first means so as to rotate said roll indepedently of the movements of said stencil, said drive unit comprising an infinitely variable speed drive, and further comprising torque transmitting means separably coupling said drive unit with said roll; and means for moving said drive unit into and out of coupled engagement with said roll, so that said drive unit may be uncoupled form said shaft and moved to other locations.

3,988,986

ANTI-DROOLING DEVICE FOR SCREEN-PRINTING MACHINE

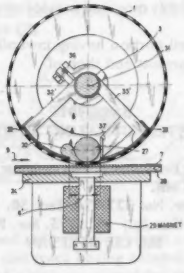
Peter Zimmer, Untere Sparchen 54, A 6330 Kufstein, Austria

Continuation of Ser. No. 348,703, April 6, 1973, abandoned. This application Jan. 6, 1975, Ser. No. 538,560

Claims priority, application Austria, Apr. 10, 1972, 3047/72

Int. Cl.² B41F *15/42*; B05C *1/08*

U.S. Cl. 101—119 6 Claims



1. In a printing machine having an apertured screen movable in a predetermined direction and a source of dyestuff overlying a narrow penetration zone in the path of movement of said screen for imprinting an underlying substrate through the interstices of the screen, in combination:

an applicator roller normally resting floatingly on said screen, said roller being rotatable by the moving screen for forcing dyestuff from said source through said interstices in said penetration zone;

stationary guide means above said screen defining a downstream boundary of said penetration zone for preventing entrainment of said roller by the moving screen; and

a shutter blade above said screen provided with a leading edge defining an upstream boundary for said penetration zone, said blade being movable along the upper screen surface across said penetration zone toward said guide means for lifting said roller off said screen while temporarily blocking the outflow of said dyestuff.

3,988,987

COMBINATION STAMP

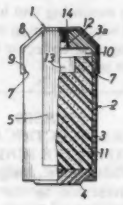
Kenichiro Ikura, Osaka; Nobukazu Sakamoto, Osaka; Tetsuo Koyama, Kyoto, and Masaru Miyazaki, Osaka, all of Japan, assignors to Yamauchi Rubber Industry Co., Ltd., Osaka, Japan

Filed Oct. 23, 1974, Ser. No. 517,385

Claims priority, application Japan, Oct. 23, 1973, 48-122972[U]; Apr. 15, 1974, 49-42462[U]; June 11, 1974, 49-68198[U]; June 22, 1974, 49-73710[U]; Sept. 13, 1974, 49-111317[U]

Int. Cl.² B41F *31/02*

U.S. Cl. 101—327 4 Claims

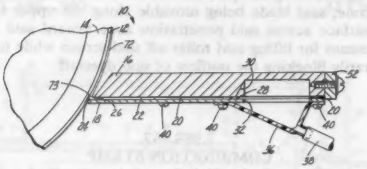


1. A combination stamp comprising a plurality of stamp elements, each stamp element including a stamp frame having upper and lower ends and a stamp plate provided in the lower end of the stamp frame, each stamp frame having a pair of opposed side surfaces and a pair of opposed end surfaces, one of the end surfaces of each stamp frame including a dovetail projection extending upwardly from the lower end of the frame and the other end surface of each stamp frame having a dovetail groove extending upwardly from the lower end of the frame, each pair of adjacent stamp elements being interlocked against relative horizontal movement by the receipt of the dovetail projection of one of the stamp elements in the dovetail groove of the other of the stamp elements, each of the opposed side surfaces of each stamp frame having a groove extending between the opposed end surfaces adjacent the upper end of the stamp frame and aligned with the grooves of the other stamp frames, and a generally channel-shaped holding member having a central portion extending over the upper ends of the stamp frames and a pair of parallel end edges, the end edges of the holding member being removably received in the aligned grooves on each of the side surfaces of the stamp frames to prevent relative vertical displacement of the stamp elements.

3,988,988
DEVICE FOR DRYING THE SURFACE OF A BLANKET CYLINDER OF INK WASHING SOLVENT

Harvey James Sable, Cleveland, Ohio, assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Apr. 21, 1975, Ser. No. 570,222
Int. Cl.² B41L *41/00*; B41F *35/00*, *9/08*
U.S. Cl. 101—425 **6 Claims**



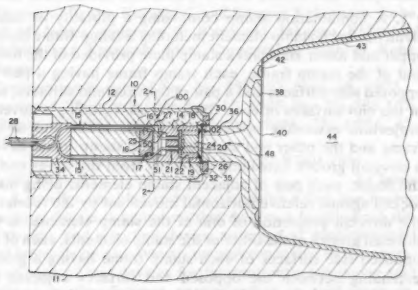
1. In a printing machine equipped with a rotatable resilient blanket adapted to carry on its surface a transferrable ink pattern to be transferred to a receiving surface, and including a solvent wash removal means comprising a liquid collector extending transverse the direction of rotation of said blanket cylinder and coextensive the width of said blanket, said collector having a capillary channel formed between upper and lower rigid plates in spaced apart relation to one another so as to form the capillary channel therebetween with an entryway adjacent the blanket surface for removing wash liquid applied to the blanket, wiping means adjacent said entryway for forming a liquid bead at the entryway to said channel, whereupon the liquid bead moves through and occupies said channel by capillary forces;

means for movably mounting and locating said collector in a predetermined wiping relation to said blanket including means for moving said collector into and out of contact with said blanket surface.

3,988,989
HIGH-PRESSURE, ELECTRICALLY INITIATED EXPLOSIVE IGNITER

John W. Shea, King George, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 10, 1975, Ser. No. 611,953
Int. Cl.² C06C *3/00*
U.S. Cl. 102—28 R **7 Claims**



1. In an electrical explosive initiator having a cylindrical body, a rear seal, electrical ignition leads coming into said body through said rear seal, a container for an explosive ignition mix located within said body at the front end and a bridge wire within said container, said electrical ignition wires being connected to said bridge wire, the improvement comprising:

cylindrical cutting means having a front corner and being located within said initiator body, said electrical leads running through the body into a space between the cutting means and the body; and

cylindrical piston means located within and abutting said initiator body in front of and spaced from said cutting means, said piston means being formed with a central front boring, a central rear boring, and a peripheral lip which engages said piston,

said ignition mix container being located in said front boring and said electrical leads running through said rear boring and said piston means to said ignition mix container,

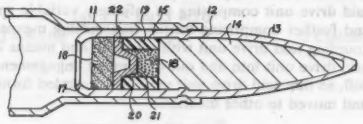
said rear boring being formed with a cylindrical rear portion and a tapered front portion, the inner diameter of the rear portion being slightly larger than the outer diameter of the corner section of said cutting means,

whereby, when the piston means is moved to the rear, the electrical leads are sheared off between the edge of said rear boring and the corner of said cutting means, and the rear of the piston is driven into the space between the cutting means and the initiator body and the tapered portion is driven against said corner to form a tight seal between the corner, the piston means and the initiator body.

3,988,990
PROJECTILE

Hugh D. MacDonald, Jr., Cinnaminson, N.J., and Peter Tietz, Meppen, Germany, assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 3, 1975, Ser. No. 610,029
Int. Cl.² F42B *13/34*
U.S. Cl. 102—49.7 **5 Claims**



1. A projectile comprising,

a projectile body having a forward nose portion and a substantially cylindrical sidewall portion,

a metallic slug substantially filling said forward nose portion,

propellant gas generating means in said body rearward of said slug,

a pressure sensitive igniter in contact with said propellant gas generating means, and

a porous disc slidably mounted in said body rearward of said igniter,

said body sidewall portion having inwardly directed flange means at a rearmost end thereof.

3,988,991
CONVEYOR SYSTEM UTILIZING SHIELDED READER UNITS

Horace M. Swartz, Doylestown, Pa., assignor to FMC Corporation, San Jose, Calif.

Continuation of Ser. No. 327,976, Jan. 30, 1973, abandoned. This application July 18, 1975, Ser. No. 597,260
Int. Cl.² B61J *3/04*
U.S. Cl. 104—88 **5 Claims**

1. In a tow truck conveyor system having a main line and a plurality of spur lines, switches to connect said spur lines to said main line, transport vehicles movable along said lines, a stationary receptacle adjacent each spur line switch, code apparatus to operate a particular switch in response to the approach of a particular vehicle provided on each transport vehicle and in each receptacle including means to transmit an

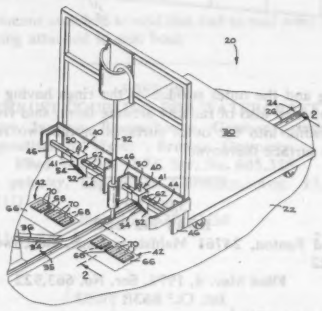
energy beam between the receptacle and the vehicle when the code apparatus is set for operation of the particular switch by the particular vehicle,

the improvement comprising:

means to mount the code apparatus to direct said energy beam between the receptacle and the transport vehicle along a linear path substantially inclined with respect to the vertical,

a fixed cover on said receptacle,

said cover being disposed vertically directly over the code apparatus in the receptacle at all times, including the interval during which said linear energy beam is transmitted between the receptacle and the vehicle, to shield said apparatus from vertically falling debris, and



an open slot in said cover horizontally spaced from the position of the code apparatus in the receptacle and in the path of said inclined linear beam for the unobstructed transmission of the beam through said open slot and thereby without interception by said cover,

said code apparatus in said receptacle further including means to transmit a plurality of linear beams disposed in laterally spaced relation, said cover shielding said transmitting means, and an open slot in said cover for each of said beams.

3,988,992

HIGH SPEED RAILWAY TRUCK

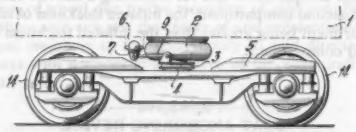
Manfred Schindehütte, Calden, Germany, assignor to Wegman & Co., Kassel, Germany

Filed July 24, 1974, Ser. No. 491,424

Claims priority, application Germany, July 25, 1973, 2337771

Int. Cl.² B61F *3/08, 5/10, 5/14, 5/24*

U.S. Cl. 105—199 CB **7 Claims**



1. In a high speed rail vehicle having a car body to which a truck is attached, said truck having a frame, at least two wheel sets, the wheels of which are joined by an axle, the ends of which are mounted in an axle bearing supporting said frame, each of said wheels having a wheel crown and a hub, the improvement which comprises in combination:

A. Friction bearings disposed between the car body and said frame, which friction bearings restrain movement of said frame about its vertical axis until the friction between said friction bearing and said frame has been overcome;

B. Said axle bearings having the shape of mutually inclined bearing surfaces and being composed of a resilient elastic material having high stiffness in the direction of travel; and

C. A resilient elastic layer disposed in circumferential direction between said wheel crown and said hub.

3,988,993

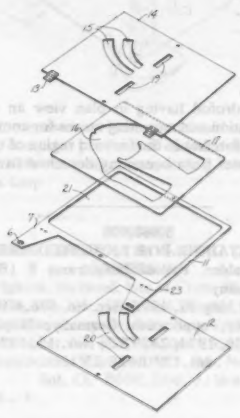
PALLET FOR REGISTERING AND SECURING A WORKPIECE

Robert V. Brophy, Gloucester, Mass., assignor to USM Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 410,038, Oct. 26, 1973, abandoned. This application July 26, 1974, Ser. No. 492,072

Int. Cl.² D05B *21/00*

U.S. Cl. 112—121.12 **8 Claims**



1. In a stitching machine which utilizes an automatically controlled carriage for moving the workpiece in relation to the stitching instruments, a device for registering and securing the workpiece in a fixed position on the carriage with respect to the instruments, comprising:

A. A base plate having a cavity therein to receive the workpiece and limit the movement thereof said cavity conforming to the shape of the workpiece and being registered in a fixed position with respect to the instruments, said base plate further having openings therein to allow access to the workpiece for the stitching instruments;

B. A cover plate removably secured to the base plate to enclose the workpiece, said cover plate having opening therein to allow access to the workpiece for the stitching instruments, said openings being in fixed registration with said instruments; and

C. Means for removably securing the base plate to the automatically controlled carriage.

3,988,994

CATAMARAN

Leopold Nitzki, Bremen, Germany, assignor to Aktiengesellschaft "Weser", Bremen, Germany

Filed June 12, 1975, Ser. No. 586,406

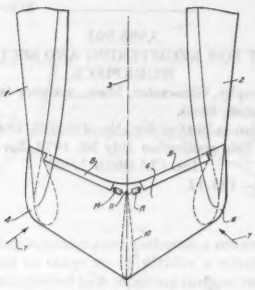
Claims priority, application Germany, June 14, 1974, 2428794

Int. Cl.² B63B *1/24*

U.S. Cl. 114—61 **8 Claims**

1. A catamaran vessel having a central longitudinal axis, comprising a pair of elongated hulls located at opposite sides of said axis; a bulbous forefoot on each of said hulls and inclined to said axis, each forefoot having an inner side facing

said axis at which the flow of oncoming water becomes detached from a respective forefoot and generates undesirable eddy currents; and means for preventing the formation of said eddy currents in the region of said inner sides of said forefeet,



comprising a hydrofoil having in plan view an arrowhead-shaped configuration and mounting means for connecting said hydrofoil to said forefeet in the forward region of the vessel so as to prevent water from becoming detached from the forefeet.

3,988,995

CONTAINER FOR LIQUEFIED GAS

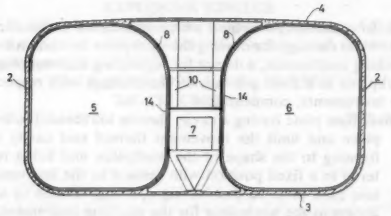
Ulrich Finsterwalder, Pagodenburgstrasse 8 (BRD), 8000 Munich, Germany

Filed May 12, 1975, Ser. No. 576,470

Claims priority, application Germany, May 14, 1974, 2423381; Aug. 20, 1974, 2439763; Nov. 13, 1974, 2453692

Int. Cl.² B63B *25/12*

U.S. Cl. 114—74 A **12 Claims**



1. Container for liquified gas comprising a load-bearing container structure, said structure comprising an enclosing solid and rigid load-bearing concrete wall having a reinforcement of steel which is ductile at cryogenic temperatures, a vapor-tight sealing layer formed on the inside surface of said concrete wall, and a heat insulating barrier attached to said vapor-tight sealing layer which is continuously applied for forming a joint free continuous insulating body.

3,988,996

CLEW CRINGLE

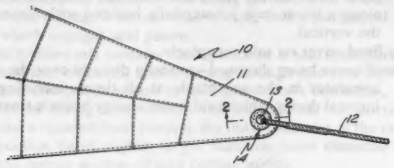
Aaron Jasper, P.O. Box 3527, St. Thomas, V.I.

Filed Sept. 15, 1975, Ser. No. 613,279

Int. Cl.² B63H *9/08*

U.S. Cl. 114—115 **2 Claims**

1. In a fabric sail a grommet or clew cringle comprising a pair of rigid rings, one on either side of the sail fabric, the surfaces of the rings against the sail fabric being flat in a single plane throughout their extent, said rings each having inner and outer edges encircling an open center and having registering openings therein between said edges and rivets through said openings holding the rings in engagement with the fabric, the inner edges of the rings about said opening being radially arcuate to provide a smooth surface to a rope through said



opening and the outer surface of the rings having the outer edges of each also of radially arcuate form, said rivets being countersunk into the outer surfaces of the two rings for a smooth surface thereover.

3,988,997

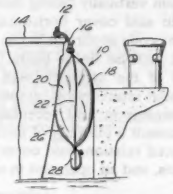
BOAT FENDER

Leonard Fenton, 24761 Maidstone Lane, Beachwood, Ohio 44122

Filed Mar. 4, 1976, Ser. No. 663,922

Int. Cl.² B63B *59/02*

U.S. Cl. 114—219 **3 Claims**



1. An inflatable, weighted boat fender which is particularly suitable for protecting the hull of the boat during locking operations, comprising a sealed, flexible, fluidtight bag formed from two elongated sheets of flexible fluidtight material sealed together about their peripheries and having a transverse seal which forms first and second sealed compartments, said transverse seal being located closer to one end of the bag than the other, first and second port means respectively provided in said first and second sealed compartments for admitting air to said first compartment and for admitting a heavier substance to said second compartment, the inflated thickness of said first compartment being greater than the inflated thickness of said second compartment.

3,988,998

BOAT ANCHORING DEVICE

Hardy Louis Kendrick, Star Rte., Box 12, Jena, La. 71342

Filed Mar. 1, 1976, Ser. No. 662,441

Int. Cl.² B63B *21/00*

U.S. Cl. 114—230 **7 Claims**

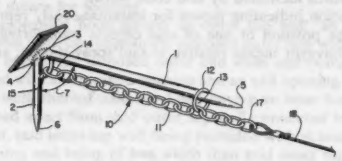
1. A boat anchoring device that can be used to secure a boat to a river bank, comprising:

a. two arms attached together at one of their ends at an angle of 90° or less, one arm being longer than said other arm, each arm having its other end shaped to a point; and

b. a boat connecting assembly fixedly attached at one end to said arms, said assembly comprising:

i. a ring link, said link mounted about said longer arm,

said link having a hollow center of sufficient diameter to slide up and down said longer arm, and



ii. a means attached to said link and to said arms and also being attached to said boat.

3,988,999

THRUST COUPLING FOR WATERCRAFT

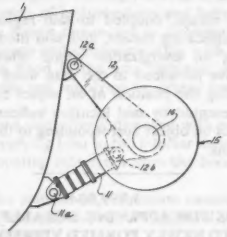
Hans-Georg Janssen, Bremerhaven, Germany, assignor to Aktiengesellschaft "Weser", Bremen, Germany

Filed Aug. 18, 1975, Ser. No. 605,328

Claims priority, application Germany, Aug. 17, 1974, 7427990[U]

Int. Cl.² B63B *21/56*

U.S. Cl. 114—235 A **7 Claims**



5. A thrust coupling for watercraft, comprising a coupling element adapted to be freely inserted into a guide track at the stern of a watercraft to be pushed and including two substantially hemi-spherical members having respective flat sides which are juxtaposed; support means connectable to the bow of a thrust-exerting watercraft so as to extend forwardly and downwardly with respect to said bow; and mounting means for mounting said coupling element on said support means so as to be freely turnable about an axis extending transverse to the direction of travel of said thrust-exerting watercraft and normal to said flat sides, the coupling force between coupled watercraft being transmittable both in and transverse to the direction of travel due to the mounting of said coupling element about said axis and the ability of said substantially hemispherical members to roll transversely to said direction engagement with surfaces at said stern of the watercraft to be pushed.

3,989,000

OUTBOARD MOTOR ELECTRIC STEERING CONTROL

John D. Foley, Jr., Shreveport, La., assignor to Ram-Glas Products, Inc., Little Rock, Ark.

Filed Aug. 11, 1975, Ser. No. 603,675

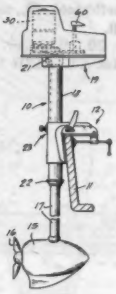
Int. Cl.² B63H *21/26*

U.S. Cl. 115—18 E **11 Claims**

1. In an outboard motor steering control having a vertical-axis electric steering motor for selectively rotatably orienting a pivot shaft carrying a propulsion device, the improvement of power transmission and slip clutch means between an output of the steering motor and the pivot shaft, comprising:

an output wheel driven by the steering motor output and having teeth means engageable with an endless loop having corresponding teeth means therein; and

a torque wheel driven by said loop and having teeth means engageable with said loop, said torque wheel being attached corotatably to said pivot shaft; and wherein



said teeth means on at least one of said output and torque wheels comprise portions of elastic deformable material spaced between said corresponding teeth means of said endless loop.

3,989,001

MACHINE FOR SPRAY-COATING CAN BODY EXTERIORS

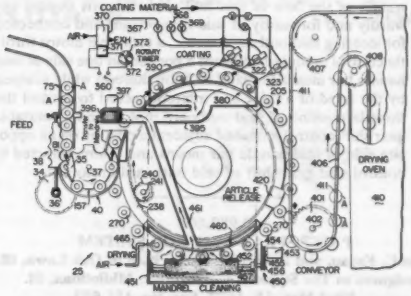
Roger S. Brigham, deceased, late of Crete, Ill., and by Loraine M. Brigham, sole heir, Harwood Heights, Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Continuation of Ser. No. 603,709, Dec. 16, 1966, abandoned.

This application Feb. 18, 1971, Ser. No. 116,673

Int. Cl.² B05C *5/00*, *11/10*

U.S. Cl. 118—7 **21 Claims**



1. Apparatus for spray-coating container bodies comprising means for conveying a plurality of container bodies along a predetermined path, a plurality of spray nozzles disposed adjacent a portion of the path for directing coating material against the container bodies, means for rotating the container bodies during the travel thereof along said path portion, a source of coating material, means placing said spray nozzles in fluid communication with said source of coating material, and means for sequentially actuating said spray nozzles to direct coating material from a first spray nozzle against a first circumferential portion of a container body and the entire axial length thereof but not completely about the entire circumference thereof, and to thereafter direct coating material from a second spray nozzle against a portion of said first circumferential portion and a second circumferential portion of said container body and the entire axial length thereof

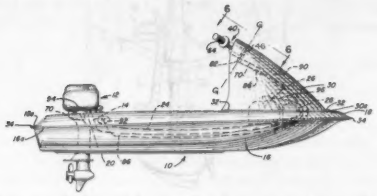
thereby circumferentially overlapping the coating material in the absence of a complete overlapping of the entire circumference of the container body.

3,989,002

MOTOR POWERED WATERCRAFT FOR RIDING IN STANDING POSITION

Philip C. Peterson, Northbrook, Ill., assignor to Philip C. Peterson, Northbrook, Ill.

Filed Nov. 20, 1975, Ser. No. 633,802
Int. Cl.² A63H *5/08*
U.S. Cl. 115—70 **26 Claims**



1. In a watercraft adapted to be powered by an outboard motor pivotally mounted on a transom for steering said watercraft, said motor including a throttle, and a gear shift, the combination comprising:

a hull having a bottom wall, a bow and a stern;

floor means on said hull adapted for supporting a rider in standing position intermediate the bow and stern of said hull;

a rider support structure adjacent a forward end of said floor means extending upwardly to a level above said floor means for providing support for a rider in standing position on said floor means, and

control means for said motor including handle bar means pivotally mounted on said support structure for limited pivotal movement in a plane sloping upwardly and rearwardly of the bow of said hull about an axis sloping upwardly and forwardly of said floor means and connected for steering said outboard motor, a rotatable motor throttle control mounted adjacent a portion on one side of said handle bar means for axial rotation thereon while grasped by the hand of a rider and interconnected to control the throttle position of said outboard motor, and a rotatable gear shift control mounted adjacent a portion on an opposite side of said handle bar means and interconnected to control said gear shift of said outboard motor.

3,989,003

PAINT SPRAY CONTROL SYSTEM

John C. Fagan, and Robert M. Bania, both of Oak Lawn, Ill., assignors to The Sippican Corporation, Midlothian, Ill.

Filed Mar. 15, 1974, Ser. No. 451,553
Int. Cl.² B05C *11/02*
U.S. Cl. 118—2 **13 Claims**

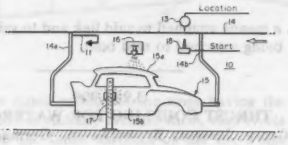
1. A paint spray control system, for controlling a paint spray apparatus including a paint spray station having at least one spray gun and conveyor means for transporting objects of diverse styles past said spray gun, comprising:

advanceable memory means;

input means for depositing into said memory means a first set of data words, some of said data words in said first set representing the position of an object of predetermined style relative to said spray station, a second set of data words, one of said data words in said second set being representative of the style of one of said objects transported by said conveyor means, and at least one code word identifying which one of said objects on said conveyor means is next to enter said spray station;

style means, coupled to said memory means, for storing style information from the one of said second set of data words identified by said code word;

location indicating means for instantaneously representing the position of one of said objects transported by said conveyor means relative to said spray station; and



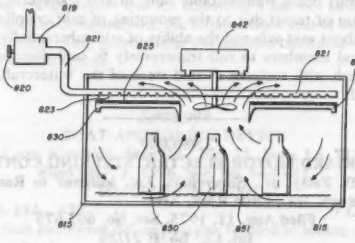
comparison means, coupled to said register means, said location indicating means, and said memory means, for producing an energization signal after said memory means have advanced to the data word in said first set representing the position of an object corresponding to that represented by said location indicating means, and the style of an object corresponding to that stored in said style means.

3,989,004

APPARATUS FOR APPLYING DURABLE LUBRICOUS COATINGS TO NEWLY FORMED VITREOUS SURFACES

Addison B. Scholes, Muncie, Ind., assignor to Ball Corporation, Muncie, Ind.

Continuation of Ser. No. 497,748, Aug. 15, 1974, abandoned, which is a continuation of Ser. No. 342,910, March 19, 1973, abandoned, which is a continuation of Ser. No. 12,874, Feb. 3, 1970, abandoned, which is a division of Ser. No. 642,994, April 27, 1967, abandoned, which is a continuation-in-part of Ser. No. 543,620, April 19, 1966, abandoned. This application Feb. 26, 1976, Ser. No. 661,791
Int. Cl.² C23C *13/12*
U.S. Cl. 118—48 **9 Claims**



1. An apparatus for producing a smooth, lubricous coating on high-energy vitreous surfaces, comprising:

a. means for newly forming articles having high-energy vitreous surfaces including a glass forming machine and an annealing lehr,

b. a plurality of newly formed articles having high-energy vitreous surfaces being provided by the annealing lehr of said means for forming,

c. an elongated hood having an outer top wall, an outer bottom wall, two opposingly disposed outer side walls and two opposingly disposed outer end walls and being provided with an entrance opening and an exit opening in the end walls thereof, said hood also having an inner top wall spaced apart from said outer top wall connected to said hood, said inner top wall being provided with at least one opening and being of less width than said outer top wall and spaced from said outer side walls so as to define longitudinal passageways along both side walls between said inner and outer top walls,

d. a horizontally disposed foraminous conveyor extending through said entrance and exit openings said conveyor being disposed in a lower section of the hood and spaced from the bottom wall and conveying thereon and through said entrance and exit openings of the hood said plurality of high-energy surface vitreous articles to be coated;

e. at least one fan suspended at an upper portion of the hood and situated to be operatively associated with the opening in said inner top wall, said fan having its blade element horizontally disposed at an upper portion of the hood, spaced from the top walls thereof and centrally located with respect to the transverse section of the conveyor,

f. a vaporizer means disposed external to the hood enclosure and which produces a coating material vapor from a supply of an organic coating material selected from the group consisting of hydrocarbons and fatty acids,

g. fluid supply means connected to an output part of said vaporizer means and communicating with the upper interior of the hood in the area between said inner and outer top walls and supplying vaporized coating material thereto,

h. heating means operatively disposed with respect to said hood and supplying heat to the interior thereof and maintaining the coating material within the hood in its vapor state,

i. means to drive said fan in a direction causing said vaporized coating material to pass through said opening in the inner top wall, and

j. flow directing means disposed within said hood for controlling and return-directing a gaseous flow of the coating material in a continuous recirculation path defined by the flow space within said hook and including transversely through the space between said top walls, said longitudinal passageways along both side walls, transversely through the space between said foraminous conveyor and bottom wall and the central vertical portion of the hood including said opening in the inner wall, whereby the vitreous articles are coated with a monomolecular layer of said coating material on all external surfaces during the time said articles are passing between said entrance and exit openings on said foraminous conveyor.

3,989,005

OIL METERING BLADE DEVICE

Edward F. Bowler, Jr., Webster, and Thomas A. Rengert, Macedon, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 29, 1975, Ser. No. 626,903

Int. Cl.² B05C *11/04*

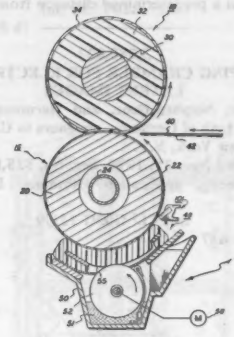
U.S. Cl. 118—60 **5 Claims**

1. In an oil wetted heated pressure roll fusing apparatus for fusing toner images to copy sheets produced from a xerographic copying machine, an improved oil metering blade device comprising:

a frame,

a blade holder assembly positioned on said frame, including a U-shaped blade holding member which is pivotable on an axis,

an elongated blade member made of a rubber material having a durometer ranging from 57 to about 67 received in said blade holding member and positioned in contact with an oil wetted fuser roll surface to effect a uniform oil thereon,



spring means for applying a loading force about said axis on said blade holding member and blade member against said fuser roll surface, said blade member having at least one longitudinally extending portion shaped as a radially curved surface where it contacts said fuser roll surface.

3,989,006

APPARATUS FOR SPRAYING AN INSULATING FOAM ON AN INSIDE WALL OF A TANK

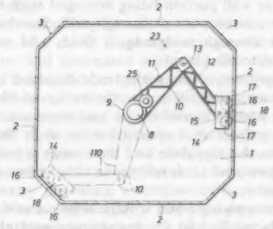
Joseph Estebanez, Upton-by-Chester, and Peter M. Linfield, Kelsall, near Chester, both of England, assignors to Shell Oil Company, Houston, Tex.

Filed June 16, 1975, Ser. No. 587,493

Claims priority, application United Kingdom, June 21, 1974, 27671/74

Int. Cl.² B05B *13/06, 5/00*

U.S. Cl. 118—306 **12 Claims**



1. Apparatus for treating the inner walls of a tank forming a fluid-containing portion of an oil tanker, said apparatus comprising

a central vertical column adapted to be substantially centrally mounted inside a tank to be treated,

an extendible arm element having one end movably secured to said vertical column for vertical movement thereon and for rotational movement around the vertical axis thereof in a selectively fixed horizontal plane,

a carriage mounted on the other end of said extendible arm element, said carriage being adapted to carry a treating tool,

vertical pivot means connecting said carriage to said arm element for allowing movement of said carriage in a horizontal plane about the vertical axis of said pivot means,

a treating tool mounted on said carriage and directed outwardly thereof toward the tank wall to be treated, and

contact means fixedly carried by said carriage on the outer edge thereof for contacting the wall of the tank to be treated and maintaining the treating tool carried by said carriage at a predetermined distance from the wall.

3,989,007

DEVELOPING CHAMBER FOR ELECTROSTATIC LATENT IMAGES

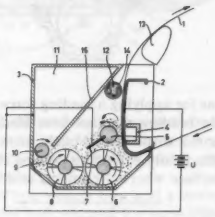
Dieter Kompe, Netphen-Deuz, and Hermann-Josef Delvos, Sassenroth, both of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 21, 1974, Ser. No. 525,827

Claims priority, application Germany, Dec. 7, 1973, 2361062

Int. Cl.² G03G *15/09*

U.S. Cl. 118—637 **3 Claims**



1. A developing chamber for electrostatic latent images provided with a device by which a developer consisting of electroscopic particles and a carrier material can be applied in the field of a magnet to a record carrier passed through the chamber, and can be carried along by the record carrier because of frictional forces, comprising:

a magnet which produces a field;

a chamber having walls comprising an electrically conductive material, and a rear wall portion comprising an electrically conductive material and having an inner surface, said rear wall portion being arranged such that a record carrier can be passed through said chamber along said surface through said magnet field, said magnet being external to the chamber;

an auxiliary non-rotating electrode disposed in said chamber so as to extend across the entire width of a record carrier passing therethrough, said electrode being a slight distance from said record carrier such that developer between the electrode and the carrier is maintained at a same potential as developer in other parts of the chamber, and

means for applying a bias voltage between said rear wall and said electrode, and for maintaining said chamber walls and said electrode at a same electric potential.

3,989,008

DOG BED

Gerhard Neumann, Schuckstr. 1, D 75 Karlsruhe 1, Germany

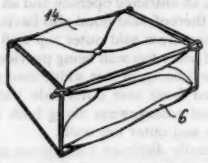
Filed May 13, 1975, Ser. No. 577,110

Claims priority, application Germany, May 14, 1974, 2423350; July 2, 1974, 2431633

Int. Cl.² A01K *1/00*

U.S. Cl. 119—1 **8 Claims**

1. A dog bed which includes in combination: housing means comprising a bottom plate with a first resting place and also comprising wall means extending substantially vertically to said bottom plate while defining an entrance to said first resting place, and supporting means arranged in vertically spaced relationship to said bottom plate and forming a second resting place acceptable directly therewith, a sleeping bag having an opening in alignment with said entrance, the top of said sleeping bag forming said supporting means, a flexible frame section associated with said entrance and operable selectively to hold said entrance open and to close said entrance, and guiding means associated with said wall means said flexible frame means being guided by said guiding means and being foldable selectively into said entrance opening position and entrance closing position.



3,989,009

FLUID CONDUCTIVITY MEASUREMENT APPARATUS

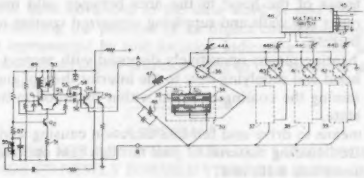
James D. J. Robar; David G. Glass, and Almand O. Barrett, all of Saskatoon, Canada, assignors to Sed Systems Ltd., Canada

Filed June 5, 1975, Ser. No. 584,068

Claims priority, application Canada, Jan. 16, 1975, 218016

Int. Cl.² A01J *7/00*

U.S. Cl. 119—14.08 **29 Claims**



1. Apparatus for determining deviant conductivity of one or more fluids of a group of fluids from a selected conductivity value, comprising:

a. first means for providing signals representative of the conductivity values of each fluid, and

b. second means connected to said first means for comparing said signals and providing output signals representative of predetermined conductivity relationships, depending on the conductivity values, for the respective fluids.

3,989,010

DESULFURIZATION OF HIGH SULFUR FUELS DURING COMBUSTION

Jan J. Arps, 414 Peavy Road, Dallas, Tex. 75218

Division of Ser. No. 483,308, June 26, 1974, Pat. No. 3,933,127. This application Oct. 23, 1975, Ser. No. 624,854

Int. Cl.² F22B *1/06;* F23G *7/00*

U.S. Cl. 122—1 R **23 Claims**

1. A method of removing sulfur from a carbonaceous fuel during combustion comprising:

a. providing a molten bath of a salt;

b. passing into said bath:

i. said fuel containing sulfur;

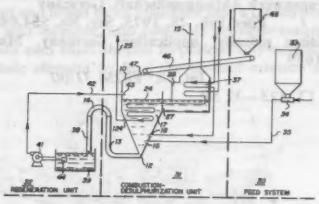
ii. a collector which will form a compound with said sulfur which is insoluble in said molten salt; and

iii. oxygen for combustion of said fuel;

c. allowing said fuel to combust and said compound to form in said molten salt bath; and

d. removing from said molten salt bath a slurry formed from vaporous products of combustion and said compound by

a process which includes the step of adjusting the height of a vertically disposed conduit connected to an outlet in



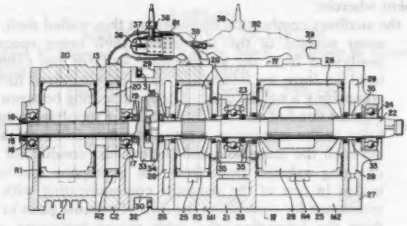
the bottom of said bath to a height sufficient to divert a column of said slurry from said bath.

3,989,011

CONSTANT PRESSURE HEATING VANE ROTARY ENGINE

Minoru Takahashi, 4533, Eda, Midori, Yokohama, Kanagawa, Japan

Filed Dec. 10, 1974, Ser. No. 531,244
Claims priority, application Japan, Jan. 25, 1974, 49-11260
Int. Cl.[2] F02B *55/14, 53/08;* **F01C** *21/06*
U.S. Cl. 123—8.15 **1 Claim**



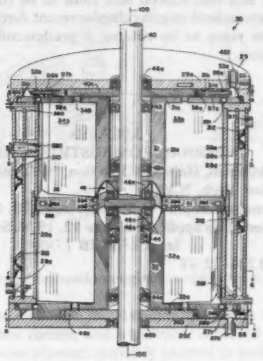
1. In a constant pressure heating vane rotary engine, plural air compressors including a primary and a secondary side, and plural air motors of substantially similar construction as said air compressors and including a primary and a secondary side, and each comprised of a rotary vane construction with a common operating shaft for the rotary vanes of said compressors and air motors respectively, said compressors and said air motors being functionally and operatively combined with couplings therebetween, said air compressors being operable to produce an air volume of an extent necessary for constant pressure heating expansion being turned into an adequate volume on the air motor side; said air compressors and said air motors being all respectively operatively coupled by progressively extending connection pipes, each said pipe serving as a gas passage; a combustion chamber operatively mounted respectively in front of the entrance to each said air motor, a water jacket being provided respectively in each of the rotors incorporated by the two units of air motors, a fluid passage being provided along an output shaft to which the two units of rotors are secured, a cylinder cover for the air motors including a water jacket, and the water jacket mounted in the rotor being communicated with the water jacket mounted in the cylinder cover by said passage.

3,989,012

THREE-ROTOR ENGINE

George J. Doundoulakis, North Bellmore, N.Y., assignor to William J. Casey, Roslyn and Helias Doundoulakis, Baldwin, both of, N.Y., part interest to each

Filed Mar. 3, 1975, Ser. No. 554,560
Int. Cl.[2] F02B *53/00*
U.S. Cl. 123—8.47 **23 Claims**



1. A rotary device comprising:
a stationary housing;
a first side rotor;
a second side rotor;
an output power shaft;
a center rotor, connected directly or indirectly with said power shaft, rotating at substantially uniform velocity in a forward direction with respect to said housing, its rotation having a predetermined functional relationship to the sum of the rotations of said first and said second rotor;
a cavity of revolution of genus 1 about an axis, including surfaces belonging to at least said first side rotor and said center rotor;
a first set of *n* diaphragms connected to said center rotor;
a second set of *n* cavity diaphragms connected to said first side rotor and alternated with said first set of *n* diaphragms inside said cavity, thereby separating the cavity in 2*n* chambers, each chamber thus being bounded along the side by a portion of the surface of said cavity of revolution and at the ends by surfaces belonging to the two cavity diaphragms, one end belonging to said center rotor, the other end to said first side rotor, with the circular geometry providing a continuous sequence of such chambers, circumferentially disposed around the axis, wherein alternately the volume of half the chambers is increased while the volume of the remaining other half of the chambers is being equally decreased as said first side rotor and said center rotor are forced to rotate with respect to each other by alternately one side rotor accelerating to substantially twice the rotational velocity of said center rotor while the other side rotor is decelerating to zero rotational velocity with respect to said housing, such increasing and decreasing of the volume of the chambers representing the execution of a plurality of predetermined strokes, the sequence of such strokes representing a preprogrammed cycle;
reverse action engaging means for tranfering torque from one side rotor to the other side rotor and to said center rotor by movably engaging said first side rotor and said second side rotor, using said center rotor as a pivot in a manner that a torque exerted between said center rotor and one of the side rotors causes a substantially equal and

opposite torque between said center rotor and the other side rotor, said engaging means further keeping the angles between said center rotor and each of said side rotors substantially equal, and transfering torque

stroke programming means for preprogramming the strokes to be performed by each of the aforesaid chambers at predetermined time intervals;

means for limiting the rotation of said first side rotor and said second side rotor in a predetermined direction; and

means for intaking energy, alternately causing said first side rotor and said second side rotor to be rotated through a predetermined angular displacement further causing said center rotor to be rotated a predetermined amount of rotation.

3,989,013

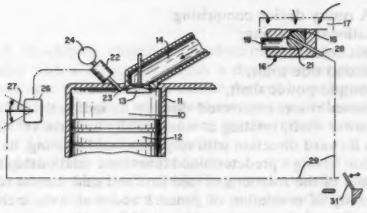
INTERNAL COMBUSTION ENGINE

Edward Mitchell, Hopewell Junction, N.Y., assignor to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 304,178, Nov. 6, 1972, abandoned. This application June 12, 1974, Ser. No. 478,562

Int. Cl.² F02B *17/00*

U.S. Cl. 123—32 ST **4 Claims**



1. Method for controlling an internal combustion engine operation through the operating range thereof, to reduce the amount of harmful pollutants formed thereby and discharged into the atmosphere said engine having at least one combustion chamber in which a power element is actuated, and into which chamber a stratified charge is delivered, said charge comprising; a combustion supporting mixture which is initially introduced into said combustion chamber to be guided into a swirling path about said chamber, and a measured quantity of fuel which is injected into the swirling combustion supporting mixture in a manner to form a localized fuel patch, a limited segment of the latter being combined with the combustion supporting mixture to form a combustible segment of the charge which is ignited to initiate the engine power stroke, the improvement for operating said engine during the operating range between idle and approximately 50 percent of full load, which includes the steps of;

a. throttling the amount of combustion supporting mixture which is introduced to said combustion chamber whereby to form a rich fuel/combustion supporting mixture ratio therein at idle operation, and progressively decreasing the degree of throttling to form a more lean mixture as the engine load is increased from idle to approximately one-half full load.

3,989,014

IGNITED INTERNAL COMBUSTION ENGINE OPERATED WITH CHARGE STRATIFICATION

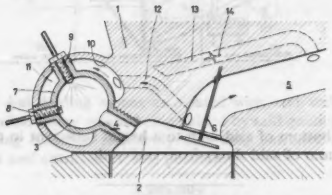
Walter Brandstetter, Gifhorn; Gerd Decker, Vorsfelde, and Kurt Reichel, Wolfsburg, all of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Germany

Filed Feb. 28, 1975, Ser. No. 554,086

Claims priority, application Germany, Mar. 8, 1974, 2411079

Int. Cl.² F02M *31/00*

U.S. Cl. 123—32 SP **7 Claims**



1. In a spark ignited internal combustion engine operated with charge stratification and including a cylinder head having a cavity defined by surrounding walls of the cylinder head, a main combustion chamber, an auxiliary combustion chamber mounted in the cavity and connected to the main combustion chamber by a connecting passage, fuel delivery means for supplying fuel to the auxiliary combustion chamber, spark ignition means for igniting a fuel-air mixture in the auxiliary combustion chamber, an intake conduit communicating with the main combustion chamber and an exhaust conduit communicating with the main combustion chamber; the improvement wherein:

the auxiliary combustion chamber is a thin-walled shell, the outer surface of the thin-walled shell being spacedly positioned from the surrounding walls of the cylinder head to form an interspace, said improvement further comprising a supply conduit communicating between the exhaust conduit and the interspace for supplying exhaust gases to the interspace, a return conduit communicating between the interspace and the exhaust conduit for discharging exhaust gases from the interspace and valve means in one of the conduits communicating with the interspace for controlling the flow of exhaust gases to and from the interspace, the valve means remaining open until the thin-walled shell is heated to within an optimum range so that exhaust gases flow through the interspace in heat exchange contact with the outer surface of the thin-walled shell for rapidly heating the thin-walled shell to a temperature within the optimum range to prevent condensation of fuel from forming in the thin-walled shell, and when the optimum range is reached the valve means closing to prevent exhaust gases from flowing through the interspace so that the temperature of the thin-walled shell does not exceed the optimum range.

3,989,015

DISTRIBUTION APPARATUS FOR AN INTERNAL COMBUSTION ENGINE WITH STRATIFIED CHARGE

Jean-Pierre Rivere, Paris, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed Mar. 11, 1975, Ser. No. 557,381

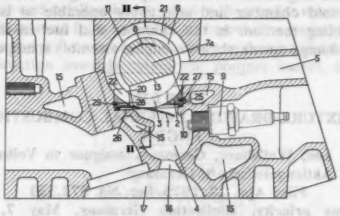
Claims priority, application France, Mar. 12, 1974, 74.08352

Int. Cl.² F02B *19/10*

U.S. Cl. 123—75 B **9 Claims**

1. In as internal combustion engine having a main combustion chamber and a prechamber formed in a cylinder head provided with conduit means for supplying air-fuel mixture to the prechamber, the improvement comprising valve means for

controlling admission of air-fuel mixture into the prechamber, a rotatable cam shaft, and a rotatable actuator mounted on said cam shaft for rotation therewith to operate the valve means, said valve means including a flat blade element, and a seat member for said flat blade element, the flat blade element being resilient and urged by its resilience into a closed position against said seat member, said rotatable actuator comprising a cam on said cam shaft shaped to periodically contact and open the blade element to feed the air-fuel mixture to the



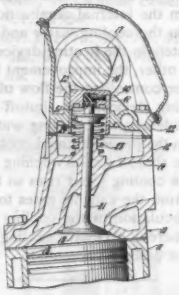
prechamber, said blade being also subjected to suction in the prechamber during the admission stroke of the engine tending to move the blade to open position, said cam shaft including a pair of spaced bearing portions adapted for rotation in a bore provided in the cylinder head of the engine, said cam being disposed between bearing portions and being of reduced size to define with the cylinder head an unsymmetrical channel which communicates with the conduit means supplying the air-fuel mixture.

3,989,016

MECHANICAL VALVE LIFTER

Robert E. Morgan, Grand Rapids, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed July 25, 1975, Ser. No. 598,744
Int. Cl.² F01L *1/14*
U.S. Cl. 123—90.16 **3 Claims**



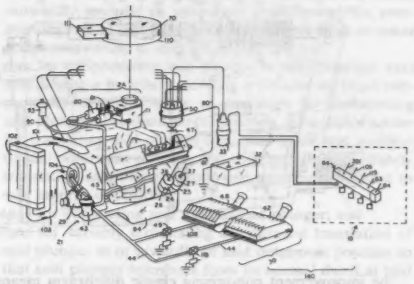
3. A valve lifter comprising a cup member having a base with a cylindrical recess therein terminating in an end wall within said base and an integral annular wall depending from said base, said cup member having a threaded bore extending from the outer periphery thereof to intersect said cylindrical recess, a set screw adjustably threaded into said threaded bore, an elastomer plug, and a piston secured to said elastomer plug, said elastomer plug and said piston being slidably positioned within said recess with said elastomer plug positioned to abut against said end wall and to be engaged by said set screw.

3,989,017

INTERNAL COMBUSTION ENGINE FUEL CHARGE TREATMENT

Oscar G. Reece, 3609 NE. 10th, Amarillo, Tex. 79601

Filed July 15, 1974, Ser. No. 488,485
Int. Cl.² F02M *27/04*
U.S. Cl. 123—119 E **14 Claims**



1. In an internal cumbustion engine comprising, in operative combination,

a. a readily magnetizable metal engine block with a combustion chamber therein and a movable shaft driving combustion driven element movably located in said combustion chamber, and

b. a fuel atomizing carburetor operatively attached to said block and in operative connection to said combustion chamber, a fuel supply line operatively connected to said carburetor, and a substantially constant magnetic field in the solid portion in said block adjacent said combustion chamber, the improvement which comprises,

c. a heating coil and a strong unidirectional, steady, continuous magnetic force producing means with its magnetic axis parallel to a portion of the length of said fuel supply line, said portion of said fuel supply line located within the outline of said magnetic force producing means and within said heating coil; said portion of the length of said supply line being a ferromagnetic tube, said magnetic force producing means having a magnetic field, said magnetic field supplementing the magnetic field in said block.

3,989,018

EXHAUST GAS RECYCLING APPARATUS

Alfred Beier, Hondelage, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Jan. 27, 1975, Ser. No. 544,220
Claims priority, application Germany, Feb. 15, 1974, 2407179
Int. Cl.² F02M *25/00*
U.S. Cl. 123—119 A **8 Claims**

1. An apparatus for recycling gas exhausted from an internal combustion engine, said apparatus including (a) a return conduit communicating with an intake manifold of the engine, (b) a return valve for controlling the quantity of exhaust gas recycled to the intake manifold, having:

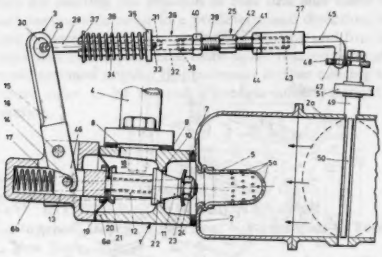
i. a valve housing interposed between and communicating with the return conduit and the intake manifold, the interior surfaces of said valve housing defining a gas flow portion and a valve stem mounting portion,

ii. a valve body movable in the gas flow portion of the valve housing so as to vary a cross-sectional flow area available in the valve housing.

iii. a valve stem mounting the valve body, and

iv. means in the valve stem mounting portion of the valve housing for movably supporting and guiding the valve stem, wherein the valve body is mounted toward one end of the valve stem and a portion of the valve stem opposite

the one end is received in the supporting and guiding means formed in the valve stem mounting portion of the valve housing, and (c) a connecting linkage operatively coupling the valve stem of the return valve to a throttle valve for the engine so that the return valve operates in accordance with relative positions of the throttle valve,



the improvement comprising elastic diaphragm means extending radially outward from the valve stem to interior surfaces of the valve housing, said diaphragm means being positioned to separate the valve stem mounting portion of the valve housing from the gas flow portion, and to seal and isolate entirely the valve stem supporting and guiding means against leakage or contamination of exhaust gas into the area of the valve stem and the supporting and guiding means.

3,989,019

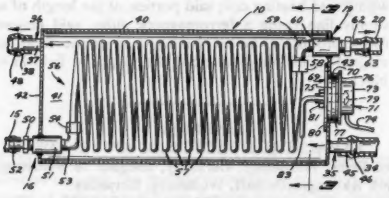
FUEL HEATING APPARATUS

Larry A. Brandt, Horace, N. Dak. 58047, and Bruce R. Johnson, Box 12, Hickson, N. Dak. 58044

Filed July 29, 1974, Ser. No. 492,425

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 E **11 Claims**



1. A fuel heating apparatus for use with an internal combustion engine assembly of the type having a closed cooling medium circulation system circulating cooling medium through a plurality of cooling medium lines, and a fuel supply system adapted to deliver fuel through a fuel line to an internal combustion engine from a remote fuel supply, said heating apparatus comprising:

a closed housing defining an interior chamber;

cooling medium inlet means opening to said chamber adapted to receive cooling medium through a cooling medium line installed in said cooling medium circulation system;

cooling medium outlet means leading from said chamber to another cooling medium line located in said cooling medium circulation system;

fuel inlet means on said housing for connection with a portion of said fuel line extending from said remote fuel supply;

fuel outlet means on said housing connectable to a portion of said fuel line leading to said internal combustion engine;

heat exchange means located in said chamber adapted to carry fuel therein;

said fuel inlet means and said fuel outlet means being connected to said heat exchange means whereby heat is exchanged from said cooling medium flowing in said chamber to fuel located in the heat exchange means;

said housing having an opening to said chamber, a heater unit removably mounted in said opening, said heater unit having a plug portion to close said opening to prevent loss of cooling medium and having a heating element located in said chamber and selectively operable to heat the cooling medium in the chamber and fuel in the heat exchange means when the engine assembly is inoperative.

3,989,020

MIXTURE-DRAWING INTERNAL COMBUSTION ENGINE

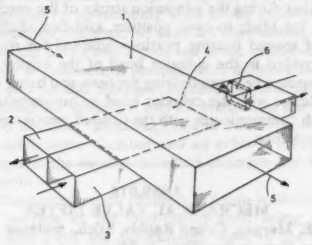
Wenpo Lee, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Germany

Filed Apr. 28, 1975, Ser. No. 572,330

Claims priority, application Germany, May 7, 1974, 2421913

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 H **4 Claims**



1. In a mixture-drawing internal combustion engine including a cooling water circulation system, an intake conduit and an automatically controlled heating device in heat exchange contact with the intake conduit, the heating device receiving cooling water from the cooling water circulation system and exhaust gases from the internal combustion engine, the improvement wherein the cooling water and exhaust gases are maintained separately in the heating device in heat exchange contact with each other, the improvement further comprising a shutoff device for controlling the flow of the cooling water through the heating device, the shutoff device remaining closed until a predetermined cooling water temperature is reached, and when the predetermined cooling water temperature is reached the shutoff device opening increasingly as the temperature of the cooling water rises so that the amount of heat transferred from the exhaust gases to the cooling water is increased by circulation of the cooling water through the heating device, whereby excessive heating of the intake conduit by the exhaust gases is prevented.

3,989,021

DASH POT ARRANGEMENT FOR DISTRIBUTION TYPE FUEL INJECTION PUMP CUT OFF BARREL

Masayoshi Kobayashi, Kawagoe, and Yasutaka Yuzawa, Kumagaya, both of Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Mar. 24, 1975, Ser. No. 561,530

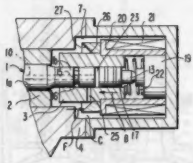
Claims priority, application Japan, Mar. 22, 1974, 49-31699; Mar. 22, 1974, 49-31700; Mar. 22, 1974, 49-31701

Int. Cl.³ F04B *49/00*; F02M 39/00

U.S. Cl. 123—139 AZ **2 Claims**

1. In a distribution type fuel injection pump having a casing, a bore within said casing, a cylindrical plunger barrel fixedly

mounted within said bore, an axially slidable and rotatable plunger mounted within said plunger barrel, a cut off sleeve slidably mounted on said slidable and rotatable plunger for relative movement with respect to said plunger and said casing, an end plug slidably and sealably mounted within said sleeve and forming with the end of said plunger a fuel compression chamber, a fixed magnetic core carred by said casing in contact with said end plug and limiting axial movement of said end plug in a direction out of said sleeve, and electromagnetic coil fixed to said sleeve and concentrically surrounding said core and axially slidable relative thereto for movement in a direction away from said plunger barrel in response to energization thereof, means spring biasing said coil and said sleeve in a direction towards cylindrical plunger barrel, an axial



channel running from said compression chamber axially through a portion of said plunger, a radial channel within said plunger, intersecting said axial channel and opening up to the periphery of said plunger, a radial cut off channel within said cut off sleeve and alignable with the radial channel of said plunger to relieve fuel within said compression chamber at cut off, the improvement comprising: deflector means fixed to said cut off sleeve and including an axially inclined surface facing radially outward of said cut off channel and toward said fixed plunger barrelfor receiving the impact of the cut off fuel jet to provide a force acting on said sleeve in opposition to the sliding resistance between the plunger and the cut off sleeve during return stroke of the plunger to reduce axial displacement of the cut off sleeve.

3,989,022

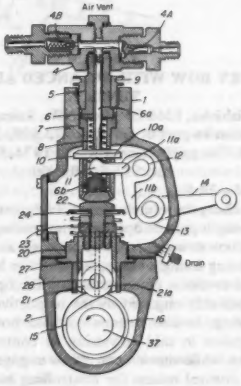
FUEL METERING MEANS FOR CHARGE FORMING DEVICES FOR INTERNAL COMBUSTION ENGINES

Arthur Franklin Pfister, 10 Cynthia Lane, Center Moriches, Suffolk County, N.Y. 11934

Filed Nov. 2, 1973, Ser. No. 412,336

Int. Cl.[2] F02M *39/00*

U.S. Cl. 123—139 AR **5 Claims**



1. A charge forming device for pumping a predetermined quantity of fuel to an internal combustion engine and including means to prevent hydraulic blockage, said device comprising:

a chamber having an inlet valve for opening when the pressure in said chamber is less than a predetermined pressure and an outlet valve for opening when the pressure in said chamber exceeds a predetermined pressure,

a plunger for drawing fuel into said chamber through said inlet valve by translating from an innermost position outwardly towards an outermost position and for compressing fuel in said chamber by translating from an outer position inwardly to said innermost position;

a cam for reciprocating said plunger in said chamber, said cam having a periphery defining a circular sector of substantially constant radius of curvature for maintaining said plunger at said innermost position, a truncated sector for translating said plunger from said innermost position to said outermost position and substantially immediately translating said plunger from said outermost position to said innermost position;

means for connecting said cam to said plunger; and

means for variably terminating the outward translation of said plunger at or inwardly of said outermost position so that said plunger translates from its normal dwell at said innermost position to said outer position to draw a predetermined quantity of fuel into said chamber and presently translates from said outer position to said innermost position to discharge said fuel through said outlet valve, said terminating means including a yoke, a remotely controlled governor for positioning said yoke, said cam acting to maintain the plunger toward its innermost position of translation whereby said governor can freely adjust said yoke without interference from the plunger, and a cup affixed to said plunger for engaging said yoke during the outward translation of said plunger and thus terminating said outward translation.

3,989,023

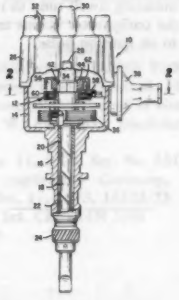
TRIGGERING ROTOR AND SENSOR ASSEMBLY

Sam A. Florio, Oregon, and Norman F. Sieja, Toledo, both of Ohio, assignors to Eltra Corporation, Toledo, Ohio

Filed June 7, 1974, Ser. No. 477,396

Int. Cl.[2] F02P *3/02*

U.S. Cl. 123—146.5 A **5 Claims**



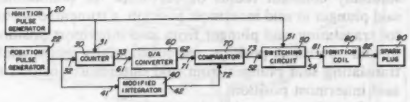
1. For use in a conventional distributor having a breaker cam and a timing mechanism, a unitary assembly for converting the distributor to use with an electronic breakerless ignition system comprising a triggering rotor, means adapted for mounting said rotor on the cam for support and conjoint rotation, a triggering sensor, means adapted for connecting said sensor to the timing mechanism, and a bearing connecting said rotor and sensor for relative rotation and supporting said sensor from said rotor and maintaining a substantially fixed radial relationship between said rotor and sensor.

3,989,024

CONSTANT ENERGY ELECTRONIC IGNITION SYSTEM

Chi Sun Lai, Lake Zurich, and Zbynek Antonin Capurka, Glen Ellyn, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 7, 1975, Ser. No. 556,235
Int. Cl.[2] F02P *1/00*
U.S. Cl. 123—148 E **10 Claims**



1. A system for controlling the ignition dwell of an internal combustion engine comprising

an ignition pulse generating means, coupled to the engine, and producing output pulses suitable for ignition firing,

a position pulse generating means coupled to the engine and producing output pulses at a rate representative of the magnitude of engine RPM,

a first circuit means for processing the position pulses and producing an output signal representative of engine position, the first means resettable to an initial state prior to the occurrence of the first position pulse following a trigger pulse,

a second circuit means, having an approximate hyperbolic transfer characteristic, for processing the position pulses and producing an output representative of engine RPM,

a comparator means for comparing the first circuit means output with the second circuit means output and producing a trigger signal in response to a predetermined relationship between the two outputs, and

switch means initiating dwell time in response to a trigger signal from the comparator means and firing the ignition in response to an ignition pulse.

3,989,025

ROTARY VALVE

Daniel Franco, 100 Fairmont St., Arlington, Mass. 02174

Filed Feb. 18, 1975, Ser. No. 550,285
Int. Cl.[2] F01L *7/00*
U.S. Cl. 123—190 BE **18 Claims**

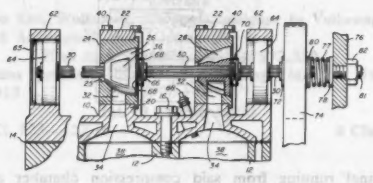
1. A rotary valve system for a combustion engine having a block defining a plurality of in-line combustion chambers, said system comprising;

a plurality of rotors each having a passage therethrough,

shaft means extending through the passage in each rotor for commonly supporting said plurality of rotors in-line with a rotor being associated with and disposed above each combustion chamber,

means for supporting said shaft means,

a housing securable to the top of the block and including means defining a recess for receiving each of the rotors, means defining an intake passage, means defining an exhaust passage an means defining a port communicating from the recess to the associated combustion chamber, said rotors each having a recess permitting communication



between the intake or exhaust passages and the port in predetermined positions of the rotor,

means for driving said shaft means and in turn said rotors including a timing gear disposed on the shaft means at one end thereof,

a plurality of thrust means one being associated with each rotor,

a plurality of means spacedly disposed along the shaft means each for holding a thrust means with one side of the thrust means for contacting a surface of the rotor,

and means disposed adjacent the one end of the shaft means for applying an axial force to the shaft means to seat the rotors in their respective recesses.

3,989,026

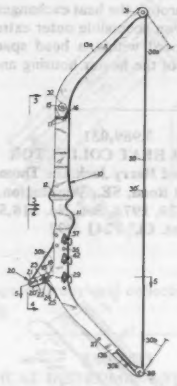
ARCHERY BOW WITH BALANCED ADJUSTABLE TENSION

Jim Zenji Nishioka, 1268 Hemlock NW., Salem, Oreg. 97304

Continuation-in-part of Ser. No. 273,699, July 21, 1972, abandoned. This application Apr. 22, 1974, Ser. No. 462,881
Int. Cl.[2] F41B *5/00*
U.S. Cl. 124—24 R **20 Claims**

1. An archery bow including a body portion, said body portion having a pair of oppositely extending bow arms with tip ends, a bowstring extending between said tip ends, said bowstring being a single elongated member having two terminal free end sections, guide means on the tip ends of each of said arms movably engaged by the respective end sections of said bowstring, tension means on said bow for producing variable tension in said bowstring to control the bowstring tension force while shooting an arrow engaged with said bowstring, and control means for controlling movements of said bow string end sections, said control means being positioned on said bow and including a pivotal member engaged by said

end sections wherein movement of said two end sections as said bowstring is drawn causes pivoting of said pivotal member

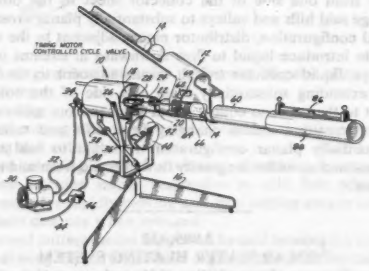


and simultaneous movement of said end sections wherein said tension developed in said end sections is at substantially equal amounts to accomplish accurate shooting of an arrow.

3,989,027
MACHINE FOR PROPELLING BALLS OF VARIOUS DIAMETERS

Edward W. Kahelin, 812 Fifth St., Manhattan Beach, Calif. 90266

Filed Oct. 16, 1975, Ser. No. 622,898
Int. Cl.² F41F *1/04, 17/00*
U.S. Cl. 124—58 **9 Claims**



1. A ball propelling machine including a barrel of a first predetermined inside diameter for propelling a ball of substantially said first predetermined diameter, pneumatic means for propelling the ball out of the barrel, the barrel including a first breech and a first breech cover movable to open and close the first breech and means to move the first breech cover in phase with the pneumatic means, the improvement comprising:

a second barrel of a second predetermined inside diameter for propelling a ball of substantially said second predetermined diameter, said second barrel including a second breech cover movable to open and close said second breech;

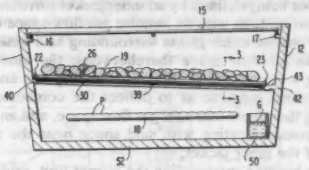
means for sealably coaxably attaching said second barrel to the first barrel; and

means connecting said second breech cover to the first breech cover to move said second breech cover in conjunction with movement of said first breech cover.

3,989,028
COAL GRATE CONSTRUCTION FOR GAS-FIRED GRILLS

Bernard B. Berger, Aiken, S.C., assignor to Ducane Heating Corporation, Columbia, S.C.

Filed Nov. 10, 1975, Ser. No. 630,681
Int. Cl.² A47J *37/07*
U.S. Cl. 126—41 R **11 Claims**

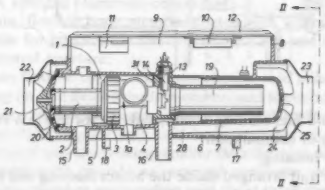


1. A gas-fired cooking unit for grilling food over a radiant bed of refractory coals comprising sidewalls defining a heating enclosure; a food holding grill supported adjacent to the top of the enclosure; a coal grate assembly mounted within the enclosure for supporting a bed of refractory coals below the cooking grill in position to direct radiant cooking heat upward toward the food holding area of the grill; burner means supported below the coal grate assembly for burning flammable gas to heat the bed of refractory coals to incandescent temperatures; said coal grate assembly including an upper grate having a plurality of elongated stringers spaced transversely apart and sloped downwardly toward one end, each upper stringer including channel means for catching and conveying to said downward end food drippings passing through the coal bed without incineration, a lower grate having a plurality of elongated stringers spaced transversely apart and sloped downwardly toward one end, said lower grate being mounted in spaced relation below said upper grate to provide passageways for upward flow of hot combustion products produced by burning gas and said lower stringers including channel means positioned relative to said upper channel means to catch and convey to said downward ends food drippings passing through both said coal bed and said upper grate without incineration; and collector means for receiving food drippings from the downward ends of the stringers of both grates.

3,989,029
LIQUID FUEL BURNING HEATER FOR VEHICLES

Reiner Friedl, Starnberg; Karl Dworschak, Munich, and Werner Hornfeck, Unterpfaffenhofen, all of Germany, assignors to Webasto-werk W. Baier KG, Stockdorf near Munich, Germany

Filed Dec. 11, 1974, Ser. No. 531,788
Claims priority, application Germany, July 9, 1974, 2432850; Austria, Dec. 11, 1973, 10333/73
Int. Cl.² F24H *3/06*
U.S. Cl. 126—110 B **12 Claims**



1. A liquid fuel burning heater, particularly suited for use in vehicles, the device comprising in combination:

a burner unit, including a burner head, a combustion air blower, means for feeding fuel to the burner head, and means for igniting the latter;

an elongated combustion chamber defined generally by a combustion tube into which the combusting air and fuel are discharged, the burner unit and the combustion chamber thus defining a longitudinal axis of the heater;

a heat exchanger chamber surrounding the combustion chamber substantially concentrically, the heat exchanger chamber being defined by an inner jacket surrounding the combustion tube with an annular gas flow space therebetween and an outer jacket surrounding said inner jacket with an air flow space therebetween; the inner jacket having a closed end portion surrounding one end of the combustion tube, so as to deflect the combusted gases exiting therefrom into said gas flow space, and an exhaust duct communicating with said space near the opposite end of the inner jacket;

a burner housing surrounding the burner unit, said housing being generally axially aligned with and connected to the inner jacket of the heat exchanger; and

a casing defining a lodgement for the burner unit by surrounding the burner housing with an air flow space therebetween the casing and the air flow space being similarly axially connected to the outer jacket of the heat exchanger and its air flow space; and wherein:

the outer jacket of the heat exchanger and said casing are integrally constituted by a unitary casting of generally tubular configuration, the casting including in its midportion a tubular radial extension serving as said exhaust duct;

a lateral head extending from said outer jacket and said casting so as to reach at least partially over both; said lateral head defining a head space for the accommodation of heater controls, having substantially parallel walls that are likewise integrally constituted by said unitary casting;

a cover closing said head space against the outside; and

an air connection leading to the intake side of the combustion air blower for the evacuation of leaked combustion gases from said head space.

3,989,030

LIQUID FUEL BURNING HEATER UNIT

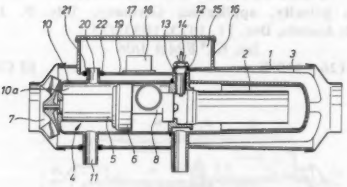
Reiner Friedl, Starnberg, Germany, assignor to Webasto-Werk W. Baier KG, Stockdorf near Munich, Germany

Continuation-in-part of Ser. No. 531,788, Dec. 11, 1974. This application June 23, 1975, Ser. No. 589,185

Claims priority, application Germany, June 22, 1974, 2430046

Int. Cl.² F24H *3/06*

U.S. Cl. 126—110 R **6 Claims**



1. A liquid fuel burning heater, suitable for use in a vehicle, comprising in combination:

a heater housing;

a burner unit arranged inside the heater housing and including a burner head, a combustion air blower, means for feeding fuel to the burner head, and an ignition plug extending accessibly from outside the burner housing to the vicinity of the burner head; and

a combustion chamber arranged inside the heater housing and located adjacent to the burner head, a heat exchanger being associated with the combustion chamber, for the transfer of combustion heat to a heat carrier medium flowing through the heat exchanger; and wherein

the ignition plug has an accessible outer extremity which is hermetically enclosed within a head space defined by lateral head walls of the heater housing and by a removable cover.

3,989,031

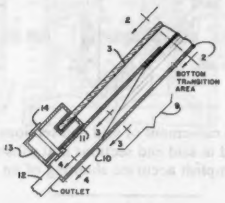
SOLAR HEAT COLLECTOR

Harry E. Thomason, and Harry Jack Lee Thomason, Jr., both of 6802 Walker Mill Road, SE., Washington, D.C. 20027

Filed Oct. 29, 1974, Ser. No. 518,577

Int. Cl.² F24J *3/02*

U.S. Cl. 126—271 **10 Claims**



1. In a solar heat collector having an upper end and a lower end, a heat collecting sheet to be exposed to incoming solar radiations and capable of absorbing a portion of said radiations and converting them to heat to warm said heat collecting sheet, said heat collecting sheet having open hills and valleys extending substantially from the upper end to the lower end to channel liquid flowing, by gravity, down thereover, upper transition means adjacent to the upper end extending substantially from one side of the collector sheet to the other to change said hills and valleys to substantially planar cross-sectional configuration, distributor means adjacent to the upper end to introduce liquid to flow downward in streams in said valleys, liquid collector trough means adjacent to the lower end extending substantially from one side of the collector sheet to the other to collect liquid streams from said valleys, lower transition means changing from hills and valleys to substantially planar configuration to adapt to said trough means, and an outlet for gravity flow of liquid from said trough means.

3,989,032

SOLAR WATER HEATING SYSTEM

Henry Harrison, Locust Valley, N.Y., assignor to Halm Instrument Co., Inc., Glen Head, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,350

Int. Cl.² F24J *3/02*

U.S. Cl. 126—271 **9 Claims**

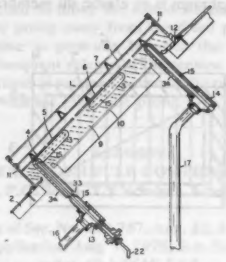
1. A system for solar heating of water in combination with a domestic hot water system having a hot water storage tank having an inlet and an outlet, and a controllable heater arranged for heating water for storage within said storage tank, comprising,

a solar heat collector having a surface which absorbs sunlight to produce heat, and a heat exchange passage for water in heat conductive relation with said absorbing surface,

piping and pump means connected to said collector and said tank for circulating water from said tank outlet through said heat exchange passage to said tank inlet,

an inflatable elastic member extending substantially the entire length of said collector passage, means to maintain

air within said inflatable member at a higher hydrostatic air pressure than the static hydrostatic water pressure in



said passage whereby said collector is rendered tolerant to freezing.

3,989,033

SURGICAL INSTRUMENT FOR BIOPSIES

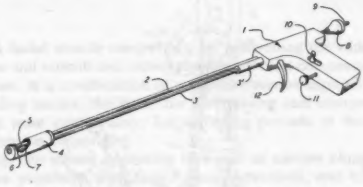
David Marcos Halpern, Fragata Presidente Sarmiento 797; Eduardo Raúl Sánchez, and Arnoldo Livoff, both of Avda. Cordoba 679, all of Buenos Aires, Argentina

Filed Dec. 5, 1974, Ser. No. 529,928

Claims priority, application Argentina, Dec. 6, 1973, 251399

Int. Cl.² A61B *10/00*

U.S. Cl. 128—2 B **8 Claims**



1. A surgical instrument for performing biopsies of an organ comprising:

a housing;

a first cutting means supported by said housing for penetrating and cutting said organ;

a first releasing means for releasing a latching means;

a first latching means responsive to said first releasing means for rapidly moving said first cutting means over a short distance when released;

a second cutting means supported by said housing for totally releasing the portion of said organ cut by said first cutting means;

a second releasing means for releasing a latching means;

a second latching means responsive to said second releasing means for rapidly moving said second cutting means over a short distance when released;

and control means for sequentially operating said first and second releasing means.

3,989,034

APPARATUS AND METHOD FOR SIGNALING FETAL DISTRESS AND UTERINE CONTRACTION MONITOR FOR USE THEREIN

George Hojaiban, Newington, Conn., assignor to Corometrics Medical Systems, Inc., Wallingford, Conn.

Filed Apr. 24, 1975, Ser. No. 571,380

Int. Cl.² A61B *5/04*

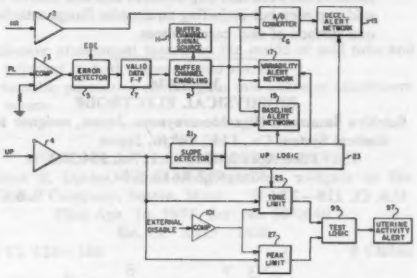
U.S. Cl. 128—2.06 F **35 Claims**

1. A fetal distress alert system comprising:

means for receiving signals indicative of the heart rate of a fetus,

means for receiving signals indicative of the uterine pressure in the mother of the fetus,

means for deriving from said heart rate and uterine pressure signals a condition voltage indicative of the condition of the fetus including timing means responsive to said uterine pressure signals and integrator means for determining the difference between the integral of the amplitude of said heart rate signals over a first time period occurring between first and second uterine contractions and the integral of the amplitude of saiad heart rate signals over a second predetermined time period substantially equal



to said first time period commencing at the peak of said second uterine contraction and terminating in response to said timing means, said condition voltage having a magnitude proportional to said integral difference,

means for storing a predetermined tolerance signal equal to an outer permissible limit for said condition signal magnitude, said tolerance signal magnitude dividing the range of possible values of said condition signal magnitude into respective acceptable and unacceptable ranges;

comparison means for comparing said condition signal magnitude with said tolerance signal magnitude, and

alert means for providing a distress signal in response to said comparison when said condition signal magnitude lies in said unacceptable range.

3,989,035

DISPOSABLE MEDICAL ELECTRODE

Werner G. Zuehlsdorff, La Crescenta, Calif., assignor to Stemmen Laboratory, Inc., Costa Mesa, Calif.

Filed Aug. 4, 1975, Ser. No. 603,026

Int. Cl.² A61B *5/04*

U.S. Cl. 128—2.1 E **14 Claims**

1. A medical electrode, comprising:

a thin, flexible body member coated with adhesive on one side for adhesion to the skin of a patient and including a central aperture;

a thin flexible barrier sheet attached to said adhesive coating on said flexible body member, said sheet being impervious to moisture and liquid vapor and having a central aperture aligned with said body member aperture, the area of said sheet being smaller than the area of said body member to provide an exposed perimeter area of said body member surrounding said sheet in all directions;

an electrically conductive snap fastener passing through said body member aperture and said barrier sheet aperture, said fastener including an enlarged flange, said

barrier sheet having a surface opposite said flexible body member abutting said enlarged flange to seal said aperture in said barrier sheet;

a thin carrier sheet formed of moisture impervious material attached to said body member adhesive, said carrier sheet having an aperture;

a liquid absorbent sponge member positioned against said enlarged flange of said snap fastener, said sponge member positioned within said aperture of said carrier sheet;

an electrolyte material impregnated within said sponge member; and

a vapor and moisture impervious cup member surrounding one side of said sponge member to enclose said sponge member between said cup member and said barrier sheet, said cup member including an annular flange attached to one surface of said carrier sheet.

3,989,036

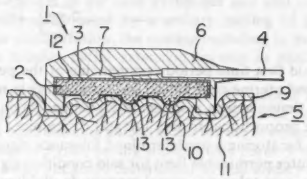
BIOPHYSICAL ELECTRODE

Soichiro Sasamori, Higashimurayama, Japan, assignor to Dia Medical System Co., Ltd., Tokyo, Japan

Filed Apr. 2, 1975, Ser. No. 564,302

Int. Cl.² A61B *5/04*

U.S. Cl. 128—2.06 E **8 Claims**



1. A biophysical electrode, comprising:

a porous, water-permeable, ceramic, insulating member of disclike shape adapted to be impregnated with a conductive liquid, said member having a portion of one surface thereof adapted to be placed in surface-to-surface contact with body tissue;

a silver coating film deposited directly on and covering the entire surface of said member except said surface portion thereof, said silver film defining an electrode;

an insulating housing encapsulating and in air-tight contact with said silver film, said housing having an opening exposing said surface portion of said member; and

an electrical conductive lead in electrical contact with said silver film and extending through the housing.

3,989,037

FLOW MEASURING DEVICE

Manfred Franetzki, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

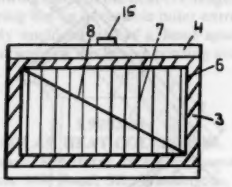
Continuation-in-part of Ser. No. 155,190, June 21, 1971, abandoned. This application Mar. 5, 1975, Ser. No. 555,360

Claims priority, application Germany, June 23, 1970, 2030775

Int. Cl.² A61B *5/08*

U.S. Cl. 128—2.08 **4 Claims**

1. A flow meter, particularly a breathing flow receiver for the diagnosis of lung functioning, comprising a flow pipe, having a built in diaphragm, positioned to extend transversely across the interior of said pipe, for producing a difference of pressure between both sides of said diaphragm depending on the strength of flow in said flow pipe, and tubular pneumatical connecting pieces in pneumatical communication with the lumen of said pipe on opposite sides of said diaphragm for obtaining the different pressures on said both opposite sides and supplying them to a differential pressure sensing and indicating means for sensing the difference between said both pressures and indicating the sensed difference of pressure as a direct measure of the strength of flow in said flow pipe, and wherein said diaphragm is an elastic slit membrane consisting



of separate cut portions of individual different elastic lengths having different sizes and being attached to inner walls of said pipe, said individual different elastic lengths forming different flow receiving surfaces for the flow pipe.

3,989,038

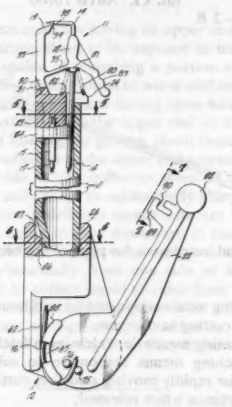
FETAL ELECTRODE AND BIOPSY DEVICE

Theodore C. Neward, 521 Scripps Drive, Claremont, Calif. 91711

Continuation-in-part of Ser. No. 526,526, Nov. 25, 1974, abandoned. This application Dec. 15, 1975, Ser. No. 641,033

Int. Cl.² A61B *10/00*, *5/04*

U.S. Cl. 128—2 B **26 Claims**



25. A medical instrument dimensioned for insertion into a body cavity to enable placing the distal end of the medical instrument in contact with body tissue, said medical instrument comprising

an integral structure dimensioned for insertion into a body cavity and including a mounting element, a fixed element having a base end integral with the mounting element and an axially extending radially offset portion, a yieldable element extending radially inwardly from the fixed element, and a support element carried by the yieldable element,

a fixed prong radially inward from the extremity of the fixed element,

a movable electrode element having an axially extending radially offset portion imbedded in the support element and a radially inwardly extending electrode prong, the support element being biased by the yieldable element to urge the electrode prong toward engagement with the fixed prong, the prongs limiting insertion of the medical instrument upon contacting body tissue, and

a combination electrical conductor and tension member attached to the support element for accessibility externally of the body cavity, the tension member adapted when pulled to move the support element and movable electrode prong away from the fixed prong and permit body tissue to protrude between the prongs, whereby upon subsequent release of the tension member the protruding tissue is retained between the prongs in electrical contact with the electrode prong.

3,989,039

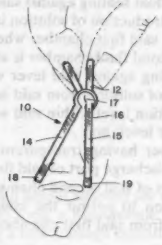
FACIAL MUSCLE COMPRESSOR

Lora Tunney, P.O. Box 633, Patchogue, Long Island City, N.Y. 11772

Continuation of Ser. No. 499,757, Aug. 22, 1974, abandoned. This application Aug. 7, 1975, Ser. No. 602,835

Int. Cl.² A61F *5/08*

U.S. Cl. 128—76 C **1 Claim**



1. A facial muscle compressor for controlling the widening of nose and nostrils and means to maintain said compressor on the nose, in a combination of a clip like means together with a padding means, the latter for maintaining said compressor on the nose comfortably, for sufficient periods of time, in combination comprising:

a clip like means consisting of a pair of narrow elongated jaw members, with finger piece extensions, one of said jaw members juxtaposed above the other jaw member with a C spring joining said jaw members together near the finger piece ends thereof, one finger piece having one end thereof angularly spaced in a vertical direction from said one end to said C spring, whereby compression of said angular offset section of said one finger piece toward said other finger piece will cause the other end of one jaw to be spaced from said other jaw thereby to accept a nose thereinbetween, said jaw members and extension finger pieces being covered with a cushioning soft plushy padding material attached onto almost the entire device, said padding means provided for the purpose of maintaining the compressor on the nose, for comfort and to eliminate danger of abrasion to the skin, further, a flap means is attached to each jaw member which extends at the bottom part of the free ends of the jaw members, made of a soft plush padding material.

3,989,040

PATIENT EXTREMITY SURGICAL DRAPE

Lewis C. Lofgren, Appleton, Wis., and Stephen E. Farrow, Concord, Calif., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 558,650, March 17, 1975, abandoned. This application Dec. 18, 1975, Ser. No. 642,030

Int. Cl.² A61F *13/00*

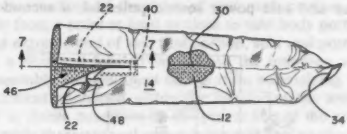
U.S. Cl. 128—132 D **7 Claims**

1. Surgical drape comprising a tube having an open end and a closed end and adapted to enclose a patient extremity characterized by,

an inside surface of a flexible, strong, nonwoven material;

at least a major portion of the outside surface of a flexible, liquid-proof film bonded to said nonwoven material;

a slit extending from said open end partially along the length of said tube;



adhesive attachment means on the inside of said tube and adjacent to both edges of said slit; and

releasable portective covering for said adhesive attachment means.

3,989,041

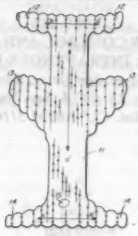
MOTION LIMITING SUPPORTIVE DEVICE

Richard B. Davies, Parma Heights, Ohio, assignor to The Kendall Company, Boston, Mass.

Filed Apr. 14, 1975, Ser. No. 567,940

Int. Cl.² A61F *13/06*

U.S. Cl. 128—166 **8 Claims**



1. A motion limiting supportive device comprising:

an elastic sheet of conformable, adhesive tape material, said sheet being a generally elongated configuration having oppositely disposed pairs of flanging anchor wings on each end of said elongated configuration and a pair of anchor tabs disposed in an intermediate position along said elongated configuration between said anchor wings, said elastic sheet including high-tensile strength nylon yarns therein and being constructed in a manner that permits widthwise stretch across the device, but provides substantially no lengthwise stretch along said elongated configuration.

3,989,042

OSCILLATOR-EXCITING SYSTEM FOR ULTRASONIC LIQUID NEBULIZER

Sadao Mitsui, and Minoru Takahashi, both of Tokyo, Japan, assignors to TDK Electronics Company, Limited, Tokyo, Japan

Filed May 29, 1975, Ser. No. 581,904

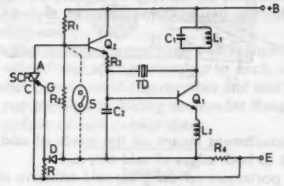
Claims priority, application Japan, June 6, 1974, 49-063341; Sept. 30, 1974, 49-112568

Int. Cl.² A61H *1/00*; A61M *15/00*

U.S. Cl. 128—194 **4 Claims**

1. An oscillator-exciting system for an ultrasonic liquid nebulizer comprising a vessel containing liquid, a power source providing an electrical potential, a piezo-oscillator element disposed in said vessel, and a self-oscillating electric circuit connected across said power source potential and a reference potential, said self-oscillating circuit having said piezo-oscillator element connected thereto as a constituent

element thereof, said oscillating circuit being adapted to oscillate at that frequency in which the electric impedance of said piezo-oscillator element is inductive, so as to nebulize the liquid by the oscillation of the piezo-oscillator element, said self-oscillating circuit including an oscillating transistor and a current-bias resistance connected between a base of the transistor and said power source potential, a second transistor



having a collector-emitter circuit connected in series with at least a part of said current-bias resistance, a float magnet floating on the top surface of said liquid, and a reed switch disposed at the bottom of said vessel and aligned with said float magnet so as to be actuated by said float magnet in response to a lowering of the liquid below a predetermined level, said reed switch being connected between a base of said second transistor and said reference potential.

3,989,043

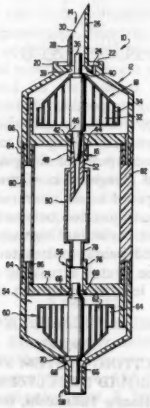
AUTOMATIC FLOW CONTROL AND AUTOMATIC SHUT OFF FOR INTRAVENOUS FEEDERS

John Dimeff, 5346 Greenside Drive, San Jose, Calif. 95127

Filed Dec. 23, 1974, Ser. No. 535,390

Int. Cl.² A61M 5/16

U.S. Cl. 128—214 C **6 Claims**



1. An apparatus for regulating the rate of flow of solution from a fluid reservoir to the vein of a patient, the combination comprising:

a. a first fluid chamber having intake and discharge ports, said intake being adapted to be connected to said fluid reservoir and said discharge port being adapted to be coupled to the vein of said patient;

b. means disposed within said first fluid chamber for regulating the level of said solution contained within said chamber for regulating the level of said solution contained within said chamber between a lower and an upper level and for maintaining a constant rate of flow of solution independent of the initial height or variations in height of the solution in said fluid reservoir during its depletion;

c. a second fluid chamber having an intake and a discharge port, said intake port being coupled to said discharge port of said first chamber, said discharge port of said second chamber being adapted to be coupled to the vein of said patient;

d. means disposed within said second fluid chamber for regulating the level of solution contained within said second chamber between a lower and an upper level and for maintaining the steady state rate of flow of said solution from said second fluid chamber at the same rate as the rate of flow of solution from said first fluid chamber;

e. said means disposed within said second fluid chamber for regulating the level of solution in said second fluid chamber comprising an upper and lower valve seat disposed in proximity to said intake and discharge ports, respectively, and a float disposed within said second fluid chamber, said float being vertically movable within said second fluid chamber upon application of buoyant force by said solution, said float seating against said upper valve seat to prevent the introduction of solution into said second fluid chamber from said first chamber when said solution level within said second fluid chamber is at the upper level and said float seating against said lever valve seat to prevent the discharge of solution from said second fluid chamber when the solution level within said second fluid chamber is at the lower level; and

f. a drip chamber having transparent walls and disposed between the discharge port of said first fluid chamber and the intake port of said second chamber for forming drops of said solution to permit the counting of the rate of solution flow from said first chamber to said second fluid chamber.

3,989,044

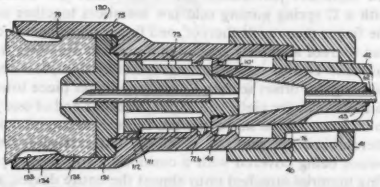
SYRINGE

Eugene J. Meierhoefer, Hackettstown, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed Aug. 11, 1975, Ser. No. 603,474

Int. Cl.² A61M 5/00

U.S. Cl. 128—218 N **7 Claims**



1. A hypodermic needle, hub and support assembly for attachment to the forward conventional needle flange and extending forward of a transversely extending shoulder of a tubular syringe barrel having a penetrable syringe diaphragm seal, said assembly comprising:

An outer portion having an opening extending throughout its length and having an integral radial annular constructing area defining a locking ring adapted to engage with the rear surface of a conventional forward needle flange, and a stabilizing skirt extending rearwardly from the locking ring to said syringe shoulder and adapted to cooperately relate with the shoulder of the syringe so as to prevent rocking of the assembly with respect to the tubular syringe barrel, and further having a rearwardly extending annular ring forward of said locking ring and adapted to extend into the penetrable syringe diaphragm seal; and an inner portion having a tapered foreshortened front end piece, said taper being such as to cooperate along its

length with the interior of a needle hub, a cylindrical midportion and a rear end portion having an outwardly extending flange, and piercing means extending rearwardly from said inner portion and about a central bore extending throughout the length of the inner piece, said bore having the same cross sectional diameter throughout its length.

3,989,045

HYPODERMIC SYRINGE

William F. Van Eck, 228 Main St., East Haven, Conn. 06512

Continuation of Ser. No. 293,489, Sept. 29, 1972, abandoned. This application Aug. 28, 1974, Ser. No. 501,448

Int. Cl.[2] A61J *1/00*

U.S. Cl. 128—272 **8 Claims**

1. A filled and sealed ampul adapted for use with a separate hypodermic needle to form a hypodermic syringe, the hypodermic needle having a flow passage extending throughout the length thereof, a pointed end portion and an oppositely disposed hollow base portion, said base portion having a conical interior surface whose wider end lies farthest from the pointed end portion, said ampul comprising:

a. an ampul vessel having a body portion with a hollow interior for containing medicament and a neck portion extending from the body portion and terminating in a free end opposite the body portion, the neck portion having a conical portion extending from its free end toward said body portion with the widest extent of said conical portion being closest to said body portion, said neck portion having an exterior opening in the free end thereof and an axial bore which extends through the entire length of said neck portion and between the interior of the ampul vessel and the exterior opening, a first portion of the outer conical surface of the sides of said conical portion being adapted to engage and tightly hold a portion of the interior conical surface of the hollow base portion of the hypodermic needle, said ampul vessel being formed of resilient resin material, the volume of the interior of the ampul vessel being reduced in response to deflection of the ampul vessel caused by the application of force to the outer surface of the body portion and being increased in response to the resiliency of the resin material upon the reduction of the force applied to the outer surface;

b. medicament partially filling a predetermined portion of the interior of the body portion of the ampul vessel, the applying of force to the outer surface of the body portion enabling the unfilled volume of the body portion to be reduced and to create a negative pressure condition therein sufficient to cause blood to enter toward the interior of the body portion when the ampul is used with a hypodermic needle and the needle is inserted into a blood vessel;

c. a cup-shaped cap assembly integrally formed with said neck portion of the ampul vessel, said cap assembly having an end wall disposed adjacent to the exterior opening of the axial bore and a side wall extending from said end wall, said side wall having an interior portion which extends toward said body portion and contiguously along the sides of the neck portion at least as far as the extreme end of said first portion of the outer conical surface of the sides of said conical portion, said cap assembly being formed of resin material which is heat sealed directly with the resin material of the ampul vessel to form a fracturable heat seal portion fusing the interface of the interior portion of the side wall of said cap assembly directly to the outer surface of the sides of said neck portion upwardly from a point at least as close to said body portion as said extreme end of said first portion, said seal portion being a heat seal formed throughout the interface, said cap assembly and said heat seal portion maintaining the medicament contained within the interior of the ampul vessel in sterile condition by the prevention of the entry of bacteria thereinto and maintaining said first portion of the outer conical surface of the sides of the conical portion in a sterile condition, the seal portion upon being fractured enabling the interior portion of the side wall of the cap assembly to be separated from the outer surface of the sides of said neck portion and permitting removal of said cap assembly from said neck portion and subsequent engagement of the portion of the interior conical surface of the base portion of said needle to said sterile first portion of the outer conical surface of the sides of said conical portion.

3,989,046

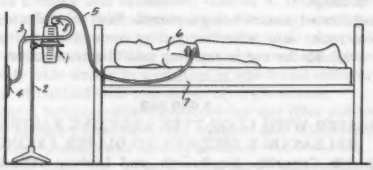
ASCEPTIC DISPOSABLE RIGID RECEIVER FOR BODY DRAINAGE

Karl A. Pannier, Jr.; Gordon S. Reynolds, and James L. Sorenson, all of Salt Lake City, Utah, assignors to Sorenson Research Co., Inc., Salt Lake City, Utah

Filed Jan. 30, 1975, Ser. No. 545,376

Int. Cl.[3] A61M *1/00*

U.S. Cl. 128—276 **8 Claims**



1. A self-sustaining body drainage receiver having tubular fittings in the top thereof for connection to the body of a patient and to a vacuum source, wherein the improvement comprises

said receiver initially being in separate upper and lower generally cup-shaped sections each of which has therein a receiving chamber space adapted to complement the chamber space of the other section to provide a combined receiving chamber intended to contain body drainage, and each of said sections having a large open end, adapted to be assembled endwise with the open end of the other section,

and annular interlocking means around the margin of the open end of each said section complemental to the interlocking means of the other section,

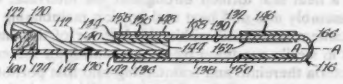
said means being adapted to be snapped together when said open ends are assembled to thereby provide an inseparable fluid tight seal and form the complete receiver from which the sections cannot be separated without breakage.

3,989,047

DIAPER WITH LOOP-TYPE ADHESIVE FASTENER

Talivaldis Cepuritis, Kenilworth, and Ludwig Tritsch, Wilmette, both of Ill., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed Sept. 29, 1975, Ser. No. 617,914
Int. Cl.[2] A61F 13/16; A41B 13/02
U.S. Cl. 128—287 17 Claims



1. A disposable diaper having a facing sheet defining a diaper inside surface for direction toward an infant, a moisture-impervious backing sheet substantially co-extensive with said facing sheet and defining a diaper outside surface, an absorbent panel positioned between said facing sheet and said backing sheet, and an adhesive tab fastener means which comprises:

an elongated tape segment folded over about a first fold line so as to form a loop substantially open when extended and having an inner face and an outer face, having first and second terminal portions and a flexible central portion integral with said terminal portions, and attached to said diaper at a marginal location adjacent to one end of the diaper;

an adhesive coating on the surfaces of said terminal portions which face each other; and

a first pressure-sensitive adhesive coating on the outer face of said central portion;

first release means on said inside surface for releasable attachment to said first adhesive coating on said central portion;

said tape segment receiving a marginal portion of said diaper between said terminal portions, said first terminal portion being permanently attached to said facing sheet, and said second terminal portion being permanently attached to said backing sheet by means of said adhesive coatings;

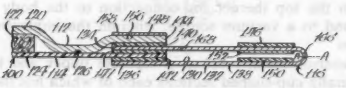
said central portion being separable from said release means to make said adhesive coating on said central portion available for use in securing said diaper about an infant.

3,989,048

DIAPER WITH LOOP-TYPE ADHESIVE FASTENER RELEASABLY SECURED TO DIAPER FACING

Talivaldis Cepuritis, Kenilworth, and Ludwig Tritsch, Wilmette, both of Ill., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed Sept. 29, 1975, Ser. No. 617,910
Int. Cl.[2] A41B 13/02; A61F 13/16
U.S. Cl. 128—287 18 Claims



1. A disposable diaper having a facing sheet defining a diaper inside surface for direction toward an infant, a moisture-impervious backing sheet substantially coextensive with said facing sheet and defining a diaper outside surface, an absorbent panel positioned between said facing sheet and said backing sheet, and an adhesive tab fastener means which comprises:

an elongated tape segment folded over about a first fold line so as to form a loop substantially open when extended and having an inner face and an outer face, having first and second terminal portions and a flexible central portion integral with said terminal portions, and attached to said diaper at a marginal location adjacent to one end of the diaper;

an adhesive coating on the surfaces of said terminal portions which face each other; and

a first pressure-sensitive adhesive coating on the outer face of said central portion;

first release means on said inside surface for releasable attachment to said first adhesive coating on said central portion;

said first terminal portion being positioned between said facing sheet and said backing sheet and being permanently attached to said backing sheet and said second terminal portion being permanently attached to said backing sheet on the diaper outside surface by means of said adhesive coatings at substantially juxtaposed marginal locations thereof;

said central portion being separable from said release means to make said adhesive coating on said central portion available for use in securing said diaper about an infant.

3,989,049

METHOD OF APPLYING AN ELASTIC RING TO AN ANATOMICAL TUBULAR STRUCTURE

In Bae Yoon, 2213 Forest Ridge Road, Timonium, Md. 21093

Division of Ser. No. 383,475, July 30, 1973, Pat. No. 3,870,048. This application Oct. 29, 1974, Ser. No. 518,617
Int. Cl.[2] A61B 17/06, 17/04, 17/12
U.S. Cl. 128—326 23 Claims

1. A method of occluding a reproductive tubular member to effect at least temporary sterilization which comprises selecting a site in the wall of the abdominal cavity near said reproductive tubular member, surgically penetrating the wall of the abdominal cavity to provide an entry therein, inserting an elastic ring applicator device containing at least one elastic ring through said entry to the location area of said reproductive tubular member, reproductive said repproductive tubular member while viewing said area and withdrawing said reproductive tubular member sufficiently to form a bend therein and to block the same, effecting release of said elastic ring onto and around said bend in the reproductive tubular member in the bent position, releasing said reproductive tubular member from the ring applicator device to free the bent portion, and withdrawing said ring applicator device from the abdominal cavity thereby leaving an occluded reproductive tubular member therein.

3,989,050

PROCESS FOR UTILIZING CERTAIN GEL COMPOSITIONS FOR ELECTRICAL STIMULATION

Gilbert Buchalter, 701 Stuyvesant Ave., Irvington, N.J. 07111

Division of Ser. No. 76,610, Sept. 29, 1970, abandoned. This application Sept. 19, 1972, Ser. No. 290,402
Int. Cl.[2] A61N 1/36
U.S. Cl. 128—419 R 3 Claims

1. The process of electrical stimulation which comprises the steps of:

a. applying a perspiration-resistant gel composition comprising a major proportion of water

from 1/20th of 1 wt. % to 10 wt. % of a long chain water soluble ionic polymeric thickener having a Brookfield viscosity (CPS) of approximately 1,000 to 100,000 at a 1 wt. % concentration in H_2O, which has been neutralized with an alkali metal hydroxide,

from 1/1,000 of 1 wt. % to 3 wt. % of a cellulosic backbone auxiliary thickener having no metallic ion constituent

which has at least one primary hydroxy group attached to each repeating unit in the cellulose backbone having a 1 wt. % solution viscosity (Brookfield) at 25° C. of from 100 to 10,000 and

from 10.5 to 25 wt. % of a polyol humectant wherein said gel has a pH of between 3.5 to 11.5, to the surface of an animal, including humans,

b. firmly contacting the resulting gel area with at least one metal electrode,

c. applying a galvanic force between said electrode and said surface.

3,989,051

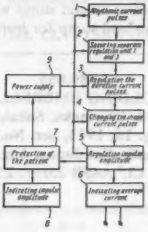
APPARATUS FOR CURRENT PULSE ACTION UPON CENTRAL NERVOUS SYSTEM

Valentin Matveevich Nozhnikov, Krasnodarskaya ulitsa, 33, kv. 82, and Eduard Mikhailovich Kastrubin, B. Pirogovskaya ulitsa, 29/31, kv. 41, both of Moscow, U.S.S.R.

Continuation of Ser. No. 510,624, Sept. 30, 1974, abandoned. This application June 30, 1975, Ser. No. 591,697

Int. Cl.² A61B *1/34*

U.S. Cl. 128—421 4 Claims



1. An apparatus for current pulse action upon the central nervous system, comprising in combination: a first means for rhythmic current pulse action upon the central nervous system of a patient, said first means having an input and an output; second means for regulating the duration of said current pulses, said second means attains in the central nervous system the second level of the first stage of general electro-anaesthesia without causing any side effects in said patient, and which has a first input and a second input and one output, said second means being electrically connected with its first input to said output of said first means; third means for regulating the amplitude of said current pulses, said third means having a first input and a second input, a first output and a second output, said third means having its first input electrically connected to said output of said second means; fourth means for indicating the mean current intensity value, said fourth means having an input and an output and being connected with its input to the first output of said third means; anode means connected to said output of said fourth means for attachment to the neck area of said patient, just under the mastoids; cathode means connected to said output of said fourth means for attachment to the forehead area of said patient; patient protection means having one input and two outputs, whose first output is connected to a power-supply, and whose second output is connected to fifth means for indicating the amplitude current value; said power-supply having an input and an output, said output connected to said input of said first means and said second inputs of said second and third means, said input connected to said first output of said patient protection means for disconnecting said power-supply from said first, second and third means when the amplitude of the acting current pulses exceeds a predetermined value.

3,989,052

TOBACCO FILLER ROD PRODUCTION

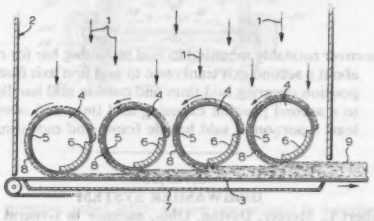
Warren A. Brackmann, Cooksville, and Daniel Dilanni, Toronto, both of Canada, assignors to Rothmans of Pall Mall Canada Limited, Toronto, Canada

Continuation-in-part of Ser. No. 384,916, Aug. 2, 1973, abandoned, which is a continuation of Ser. No. 175,926, Aug. 30, 1971, abandoned, which is a continuation-in-part of Ser. No. 128,412, March 26, 1971, abandoned. This application Mar. 27, 1975, Ser. No. 562,448

Claims priority, application United Kingdom, Mar. 28, 1974, 13886/74

Int. Cl.² A24C *5/18*

U.S. Cl. 131—84 B 11 Claims



1. A process for forming a narrow tobacco filler rod, which comprises showering a relatively wide stream of tobacco particles of narrow thickness and having a substantially uniform weight distribution of tobacco across its width onto a plurality of continuously moving arcuate suction surfaces located across the width thereof;

forming directly from said relatively wide stream a plurality of narrow substreams of tobacco each having substantially the same quantity of tobacco therein by applying suction through said surfaces to attract and grip tobacco particles to said surfaces;

changing the direction of movement of the tobacco particles forming said substreams relative to the direction of said relatively wide stream by continuously moving said surfaces, while maintaining said suction, from a position in which said surfaces contact and intercept said relatively wide stream to a position in which said surfaces are out of contact with said relatively wide stream;

moving a tobacco substream-receiving and filler rod-forming surface transverse to the width of said relatively wide stream beneath said moving surfaces;

releasing conveyed tobacco particles in said substreams from contact with said moving surfaces when said tobacco particles in said substreams are moving in substantially the same direction as and adjacent to said receiving surface and at substantially the same speed thereas;

depositing said tobacco particles immediately after said release from said moving surfaces onto said receiving surface or onto released tobacco already deposited thereon in substantially the same juxtaposition relative to one another as existed in said substreams immediately prior to said release; and

removing tobacco filler rod from said receiving surface.

3,989,053

COMPACT HAIR PICK

Paul W. Schneider, 37 Coolidge Road, Danvers, Mass. 01923

Filed Jan. 27, 1976, Ser. No. 652,779

Int. Cl.² A45D *1/00*

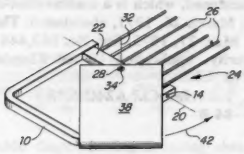
U.S. Cl. 132—11 R 3 Claims

1. A compact hair pick comprising:

a handle frame;

a pick assembly including a mounting bar rotatably mounted to said handle frame for rotation about a first axis and a plurality of tines extending from said mounting

bar transversely to its axis of rotation, said pick assembly and cover being rotatable as a unit from a first position in which said tines and cover extend toward and are within said handle frame to a second position in which said tines and cover extend away from and are external to said handle frame; and



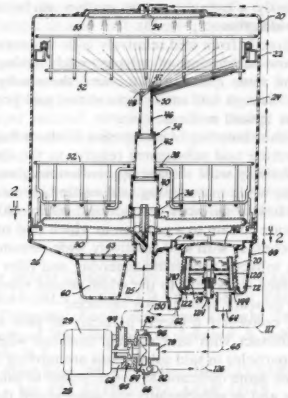
a cover rotatably mounted to said mounting bar for rotation about a second axis transverse to said first axis from a first position covering said tines and outside said handle frame to a second position exposing said tines and covering at least a portion of said handle frame and mounting bar.

3,989,054

DISHWASHER SYSTEM

Robert L. Mercer, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 28, 1975, Ser. No. 626,035
Int. Cl.² B08B *3/02*
U.S. Cl. 134—104 **4 Claims**



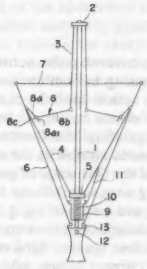
1. In a dishwasher having a washing period and a draining period, the combination comprising: a washing chamber, a fluid discharge device for introducing washing fluids into said chamber, wall means forming a sump having a pair of filter portions for receiving the washing fluids from said chamber, one of said filter portions communicating directly with said washing chamber and connecting directly with the other of said filter portions along a tangent to the circumference thereof whereby said other filter portion communicates indirectly with said washing chamber through said one filter portion, a recirculation pump having a single impeller and a pump volute divided into two predetermined volumes forming a pair of supply openings, a discharge conduit connected from said other filter portion to said recirculation pump for returning washing fluids to said recirculation pump, supply conduit means connected to one of the supply openings of said recirculation pump for supplying washing fluids from said recirculation pump to said fluid discharge device, a self-cleaning filter means including a vertically oriented strainer within said other filter portion between the tangential connection of said filter portions and said discharge conduit in the path of the recirculated washing fluids, said wall means forming the other filter portion of said sump including means forming a sufficiently wide and descending trough around the upstream side of said strainer to induce a swirl to washing fluids entering said other filter portion from said one filter portion through said tangential connection, whereby light soil particles may be collected on the upstream side of said strainer while heavy soil particles are centrifugally forced away from the upstream side of said strainer to remain in said trough outboard of said strainer, a drain opening in said trough at the opposite end thereof from said tangential connection, a shaft member coaxially disposed relative to said strainer, a revoluble spray device inside said strainer mounted on said shaft member for projecting fluids against the downstream side of said strainer for backwashing into said trough the light soil particles which have been collected, a spray conduit connecting the other of said supply openings of said recirculation pump for supplying washing fluids from said recirculation pump to said spray device during said washing and drain periods, a drain conduit connected to the drain opening in said trough for conducting light and heavy soil particles from said trough to drain during said draining period, and a cover member forming a closed top for said other filter portion and integral with said strainer, said cover member having means for removably retaining said cover on the wall means of said sump whereby said strainer may be removed from said sump for inspection.

3,989,055

FOLDING UMBRELLA

Kazo Saito, No. 9-374, Otorinaka, Sakai, Osaka, Japan

Filed Aug. 15, 1975, Ser. No. 605,045
Claims priority, application Japan, Aug. 16, 1974, 49-93230
Int. Cl.² A45B *25/14*, *25/16*
U.S. Cl. 135—25 A **6 Claims**



1. A folding umbrella, comprising:
a contractile center rod movable between a collapsed storage position and an extended use position;
a ferrule fixedly secured to the center rod directly adjacent the upper end thereof;
a runner slidably mounted on said center rod intermediate the ends thereof;
a collapsible rib assembly movable between a collapsed storage position and an extended position, said rib assembly including a main rib, and end rib, a connecting link, an auxiliary link and a strut;
said main rib having the upper end thereof pivotally connected to said ferrule and the lower end thereof pivotally connected to the inner end of said auxiliary link;
said end rib being carried by the outer end of said auxiliary link and spaced from said main rib;
said auxiliary link consisting of a inner and an outer link member pivotally connected with each other to make the auxiliary link foldable at the pivotal joint in the course of

the movement from the extended position to the collapsed position;

said connecting link having the outer end thereof pivotally connected to the upper end of said end rib and the inner end thereof pivotally connected to said main rib at a location disposed between the upper and lower ends of said main rib;

said strut being pivotally connected at the inner end thereof to said runner and having the outer end thereof pivotally connected to one of said auxiliary link, said connecting link and said end rib including the pivotal joint thereof; and

means adapted to be brought into abutment against the auxiliary link for restraining the folding of the auxiliary link in the opened position of the umbrella thereby to keep the rib assembly stably in its opened position.

3,989,056

COMPENSATING RESERVOIR FOR A MULTI-CIRCUIT HYDRAULIC BRAKE SYSTEM

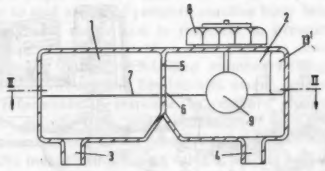
Hans-Dieter Reinartz, Frankfurt-Hausen, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Sept. 10, 1975, Ser. No. 612,079

Claims priority, application Germany, Oct. 12, 1974, 2448680

Int. Cl.² F15B 7/08

U.S. Cl. 137—574 **7 Claims**



1. A compensating reservoir for a multi-circuit hydraulic brake system comprising:

a rectangular-like housing having enclosing walls;

a single separating wall disposed in said housing, said separating wall being connected to given ones of said enclosing walls to provide two separate enclosed chambers within said housing;

a single partition disposed in at least one of said two chambers extending in a transverse relationship to said separating wall, said partition being connected to said separating wall, certain ones of said given ones of said enclosing walls and others of said enclosing walls transverse to said given ones of said enclosing walls to divide said one of said two chambers into two separate enclosed chamber compartments; and

an interconnection between said two chambers at the minimum admissible fluid level including

a first port in said partition remote from said separating wall, said first port interconnecting said two chamber compartments of said one of said two chambers,

one of said two chamber compartments, and

a second port in said separating wall, said second port interconnecting said one of said two chamber compartments and the other of said two chambers.

3,989,057

PRESSURE RELIEF SAFETY DEVICE

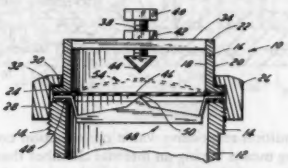
George Robert Muddiman, 524 Lakeshore Road, Beaconsfield, Quebec, Canada

Filed Apr. 8, 1975, Ser. No. 566,673

Claims priority, application Canada, July 25, 1974, 205788

Int. Cl.² F16K 17/40

U.S. Cl. 137—68 R **1 Claim**



1. A pressure relief safety device operational in a pressure range of from about 1 to about 5 pounds per square inch pressure and adapted to operate in conjunction with a substantially cylindrical conduit having a plurality of exteriorly presented threads at one end thereof, said device consisting essentially of

a substantially cylindrical housing having an outwardly extending flange at one end thereof,

an attaching member having a first cylindrical portion with interiorly presented threads adapted to mate with the threads on said one end of said cylindrical conduit and a second portion having an inwardly presented flange adapted to mate with the outwardly extending flange of said cylindrical housing to maintain the same in operative relationship to the conduit,

a thin rupturable air impermeable membrane of a synthetic flexible plastic material retained between said housing and said conduit by said flanges,

a support bar integral with said housing and extending diametrically thereof, said support bar being located at an end of the housing opposed to the end having the outwardly extending flange,

a threaded aperture located centrally within said support bar,

mounting means comprising a threaded member mating with the threads of said aperture, said mounting means having a head portion and a further portion,

rupturing means associated with said mounting means and being located on said further portion of said mounting means, said head portion having means associated therewith for adjusting the rupturing means to a desired position such that when said flexible membrane shifts from a first position occupied when the pressure condition within the conduit is within a predetermined threshold level to a second position when the pressure conditions of said conduit traverse a predetermined threshold level within the range of from about 1 to about 5 pounds per square inch pressure, said rupturing means will contact and rupture said membrane,

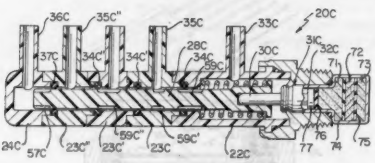
a one-piece vacuum breaker assembly comprising a cutting member and means extending therefrom to between said conduit and said housing to position said cutting member in a fixed operative centrally located relationship to the membrane on the side thereof opposed to the side on which said rupturing means are located,

said mounting means further including means thereon for visually determining the position of said rupturing means with respect to said rupturable membrane.

3,989,058
MODULAR VALVE

Byron L. Jackson, and Joseph P. Wagner, both of Knoxville, Tenn., assignors to Robertshaw Controls Company, Richmond, Va.

Filed July 16, 1975, Ser. No. 596,565
Int. Cl.² F16K *27/04*
U.S. Cl. 137—269 **9 Claims**



1. A condition responsive valve construction comprising a first housing means having an internal chamber therein and an inwardly directed shoulder projecting into said chamber and defining a first valve seat on one side thereof and a spring seat on the other side thereof, said chamber defining an open end of said first housing means that is spaced outboard of said shoulder, an axially movable valve member disposed in said chamber for controlling said first valve seat, a spring disposed between said spring seat and said valve member to tend to move said valve member in one axial direction in said chamber, and a condition responsive device carried by said first housing means and being operatively interconnected to said valve member to move said valve member in the other axial direction upon an increase in sensed condition, and a second housing means being secured to said first housing means and having a chamber aligned with said chamber of said first housing means and receiving said valve member therein, said second housing means having an inwardly directed shoulder projecting into its respective chamber, said first valve seat comprising a resilient annular member disposed against said one side of said shoulder of said first housing means and against an adjacent side of said shoulder of said second housing means while projecting inwardly beyond said shoulders to sealingly engage said valve member, said adjacent side of said shoulder of said second housing means being disposed in said chamber of said first housing means and, thus, being disposed inboard of said open end of said first housing means.

3,989,059
SUPPORT FOR INTERCONNECTION HOSE

Albert E. Price, Brookfield, and Erling Mowatt-Larssen, Warren, both of Ohio, assignors to General American Transportation Corporation, Chicago, Ill.

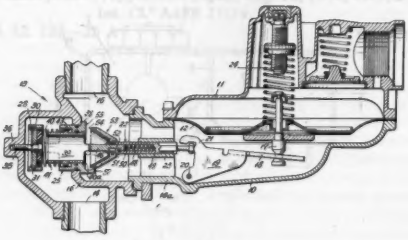
Filed Apr. 28, 1975, Ser. No. 571,909
Int. Cl.² B61D *5/02*
U.S. Cl. 137—347 **12 Claims**

1. A railway tank car adapted for interconnection in fluid communication with associated like tank cars by flexible connecting conduits for accommodating consecutive loading of fluid ladings, said tank car comprising a wheeled chassis structure provided with chassis coupling means for coupling to the chassis structure, two lading conduits respectively coupled to said tank adjacent to the opposite ends thereof in fluid communication therewith and each extending outwardly therefrom adjacent to the top thereof, a flexible hose for at least one of said lading conduits, conduit coupling means on each of said lading conduits for coupling at the top of said tank to the adjacent end of a flexible hose to place said tank in fluid communication with tanks of adjacent like tank cars, and a crane having one end thereof pivotally mounted on said tank adjacent to one end thereof, means at the other end of said crane connected to said hose, said crane being movable between a first position wherein said other end of said crane extends towards the adjacent coupled tank car and a second position wherein said crane overlies said tank, said crane in the first position thereof supporting said hose during movement of the coupled tank cars and maintaining said flexible hose at an elevation higher than that of the associated conduit coupling means so as to cause the drainage of all the lading from said flexible hose through the associated conduit coupling means and into the connected tanks, said crane in said second position thereof placing said hose for storage on said tank, said flexible hose safely accommodating the relative motions between the adjacent tank cars in transit while maintaining a fluid-tight connection therefor, whereby said tank may be connected to associated like tanks in a series through which fluid lading may flow to accommodate consecutive loading thereof while the position of said lading conduits adjacent to the top of said tank safely accommodates the relative motions between the adjacent tank cars in transit.

3,989,060
GAS PRESSURE REGULATOR

George C. Hughes, Anderson, Ind., assignor to Textron, Inc., Providence, R.I.

Filed May 29, 1975, Ser. No. 581,782
Int. Cl.² F16K *17/34*
U.S. Cl. 137—484.2 **7 Claims**



1. A gas pressure regulator comprising a diaphragm case; a valve housing having an inlet, an outlet and a dividing wall between said inlet and said outlet, said wall having a passage therethrough; a diaphragm in the diaphragm case responsive to the pressure of the gas in the regulator; and valving means controlled by said diaphragm to regulate the flow of gas through said passage, the improvement wherein there is fixed in said dividing wall a bushing which extends through said passage from said inlet to said outlet in gas-tight engagement with said wall, said valving means comprising an orifice sleeve slidably mounted in said bushing in gas-tight engagement with the interior of the bushing and having an upstream orifice forming a valve; a pressure regulating valve seat carried by said bushing and positioned to cooperate with said upstream orifice of said orifice sleeve; a valve seat on the downstream end of said bushing; and monitoring valve means operated by said diaphragm, when the gas pressure in said diaphragm case exceeds an acceptable limit, to engaged said valve seat on the bushing and shut off the flow of gas through said orifice sleeve and into said diaphragm case, said means for operating said monitoring valve including a rod slidably mounted on said diaphragm case and operatively connected to said diaphragm to be operated thereby.

3,989,061

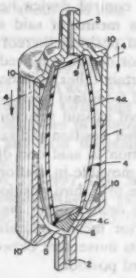
CYLINDRICAL PRESSURE REGULATOR

Peter G. Pelton, Carol Stream, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed June 2, 1975, Ser. No. 583,084

Int. Cl.² F16K *31/12*

U.S. Cl. 137—505 **1 Claim**



1. An improved pressure regulator comprising a hollow chamber having inlet and outlet means for admitting and exhausting pressurized fluid through the chamber, a pressure reactive body within said chamber member, valve means on said inlet means, said valve means being operable by said pressure reactive body in response to the pressure of said fluid in said chamber member to open and close said inlet valve means to maintain said pressure of said fluid in said chamber member at a predetermined level, said pressure reactive body having a major axis and said body being axisymmetric with respect to said axis, said pressure reactive body being extensible along said major axis in response to pressure changes within said chamber member, said pressure reactive body comprising a hollow, fluid-filled member having first and second end portions and flexible wall means, said wall means being reformable in response to pressure changes in said chamber member, the axial separation of said end portions being proportioned to the pressure in said chamber member, said valve means comprising a valve orifice on said inlet means and a co-operative valve seat on said first end portion of said pressure reactive body, said valve means being controlled by axial extension of said pressure reactive body, said wall means of said pressure reactive body being displaced radially consequent to pressure changes in said chamber member, whereby said pressure in said pressure-reactive body is maintained in substantial balance with the pressure in said chamber member, and support means maintaining said pressure reactive body in spaced relation with said outlet means whereby an unobstructed exit is provided from said chamber member, said wall of said pressure reactive body being formed of an elastomeric material, said fluid filling said reactive body being in the gaseous state, said wall member having flexible, inelastic constraint members axially disposed therein, said support means comprising a plurality of standoff ridges formed within said chamber member adjacent said outlet means and co-operating with said second end portion of said pressure reactive body, said standoff ridges being spaced to permit flow therebetween.

3,989,062

SOURCE FLUID SUPPLY AND PRESSURE CONTROL SYSTEM FOR HYDRAULIC MOTORS

Francis H. Tennis, Oconomowoc, Wis., assignor to Hydraulic Industries, Inc., Hartland, Wis.

Filed May 9, 1975, Ser. No. 576,219

Int. Cl.² F15B *13/08*

U.S. Cl. 137—596.13 **11 Claims**

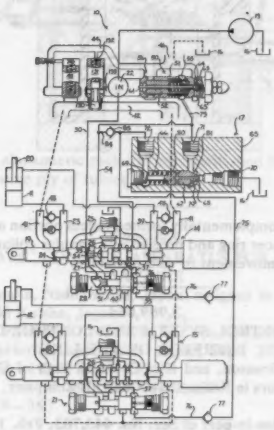
9. In combination with a control valve having valve means movable from a neutral position to a working position providing for flow of pressure fluid from a pressure fluid inlet to a motor port:

A. means providing a bypass through which inlet fluid can flow in bypass relation to said valve means;

B. valve mechanism having a bypass valve member normally closing said bypass but adapted to open under force which inlet fluid exerts thereon, and having a pressure chamber from which fluid must exit before the bypass valve member can open;

C. restricted passage means at all times communicating said chamber with the inlet;

D. means providing a passage through which fluid can exit from said chamber;



E. a controller at all times communicated with said pressure chamber and having a valve element to govern flow through said passage, said valve element having a surface upon which inlet pressure fluid from said chamber can act to effect opening thereof;

F. yieldable means holding said valve element closed with a substantially light force which can be readily overcome by pressure of inlet fluid in said chamber whenever said control valve means is in its neutral position; and

G. means for translating the pressure fluid directed to the motor port by the control valve means into an additional force on said controller valve element great enough to then hold it closed against the opening force exerted thereon by inlet fluid in said pressure chamber.

3,989,063

ELECTROMAGNETIC 3-WAY VALVE

Sytze Brouwers, Stegaurach; Gerhard Brüne, Bamberg, Gaustadt; Waldemar Hans, and Helmut Staib, both of Bamberg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 7, 1975, Ser. No. 539,222

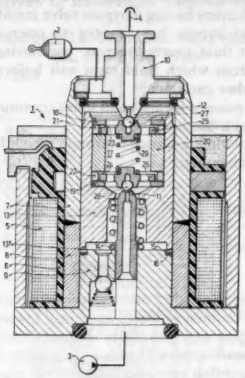
Claims priority, application Germany, Jan. 26, 1974, 2403770

Int. Cl.² F15B *13/044*

U.S. Cl. 137—596.17 **1 Claim**

1. In an electromagnetic three-way valve including a cylindrical tube portion, a magnetic coil surrounding said tube portion; a first end member located in one end of said cylindrical tube portion and carrying a first valve seat; a second counter end member, located in a second end of said cylindrical tube portion and carrying a second valve seat; an armature, capable of moving axially of said cylindrical tube portion; two axially opposite valve closure members, mounted on holders guided loosely within an axial void in said armature and spread apart axially by a spreader spring; and a main

spring, urging said armature to move toward said first end member, further characterized by said armature including an annular collar extension and said second counter end member



including a complementally formed recess portion arranged to support a spacer ring and receive said annular collar extension during axial movement of said armature.

3,989,064

FUEL CONTROL SYSTEM AND CONTROL DEVICE THEREFOR OR THE LIKE

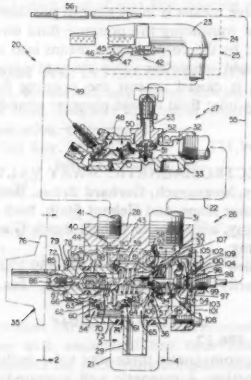
Charles D. Branson, and Roy C. Demi, both of Greensburg, Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Continuation-in-part of Ser. No. 443,783, Feb. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 380,389, July 18, 1973, abandoned. This application Dec. 9, 1974, Ser. No. 530,605

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.[2] F23N *5/06, 1/00*

U.S. Cl. 137—614.11 **6 Claims**



1. In a fuel control system for a fuel burning apparatus or the like having a source of fuel adapted to be interconnected by passage defining means to main burner means of said apparatus and a fuel control device disposed in said passage defining means and having poppet valve means that is directly manually operated for opening and closing said passage defining means so as to control the flow of fuel from said source to said main burner means, said control device having a selector means operatively interconnected to said poppet valve means to operate the same, said control device having throttle valve means downstream from said poppet valve means for throttling fuel flow through said passage defining means to said burner means, said selector means also being operatively interconnected to said throttle valve means to operate the same, the improvement wherein said selector means of said control device is provided with a cam means, said poppet valve means of said control device being operatively associated with said cam means of said selector means to be moved from a closed position thereof to an open position thereof as said selector means is moved between an off position thereof and a certain other position thereof in one direction and to be moved from said open position thereof to said closed position thereof as said selector means is moved between said certain other position and said off position thereof in an opposite direction to said one direction, said selector means being further movable in said one direction from said certain other position to a third position and from said third position back to said certain other position in said opposite direction, said selector means operating only said throttle valve means during its movement between said certain other position and said third position.

3,989,065

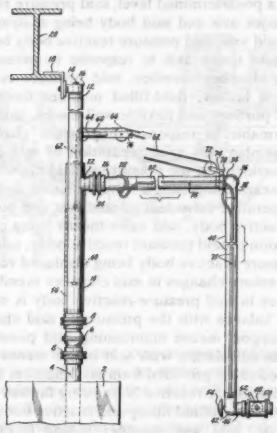
LIQUID TRANSFER APPARATUS

Gilbert McTighe, and Robert T. McTighe, both of Mitchell, S. Dak., assignors to McTighe Industries, Inc., Mitchell, S. Dak.

Filed Apr. 20, 1973, Ser. No. 353,096

Int. Cl.[2] F17D *1/00*

U.S. Cl. 137—615 **3 Claims**



1. A liquid transfer apparatus comprising:

an upstanding conduit in communication with a supply of fluid to be transferred; first swivel means, adjacent the bottom thereof, and mounting said upstanding conduit for rotation about its upstanding axis relative to said supply;

articulated conduit means carried by said upstanding conduit and extending laterally therefrom between the upper end thereof and said first swivel means;

a fixed overhead support above said upstanding conduit;

means journalling the upper end of said upstanding conduit to said support, the region laterally of said conduit, in all directions, being free of any obstruction whereby said transfer apparatus may rotate through at least a complete turn about said upstanding axis, said articulated conduit means including a generally horizontal conduit swiveled to said upstanding conduit;

upstanding guide means secured to a side of said upstanding conduit;

a counterweight movable along said upstanding guide means; and

cable means connecting said counterweight to said horizontal conduit outwardly of said upstanding conduit to counterbalance said articulated conduit means and fluid contents thereof throughout all positions of rotation of said transfer apparatus about said axis.

3,989,066

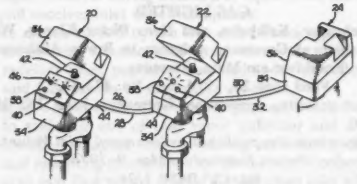
FLUID CONTROL SYSTEM

Oded E. Sturman; Benjamin Grill, and Yigal Froman, all of Northridge, Calif., assignors to Clifton J. Burwell by said Oded E. Sturman and said Benjamin Grill, Northridge, Calif., a part interest

Division of Ser. No. 213,997, Dec. 30, 1971, Pat. No. 3,821,967. This application May 20, 1974, Ser. No. 471,671

Int. Cl.² A01G *25/16*

U.S. Cl. 137—624.2 **5 Claims**



4. A fluid control system comprising:

a plurality of solenoid actuated valves each responsive to a first electrical signal to open the respective valve and a second electrical signal to close the respective valve; each of said valves including time delay means for providing said second electrical signal to close the respective valve is predetermined length of time after said first electrical signal opens said respective valve;

means for providing a first electrical signal to open the first of said solenoid actuated valves, sai solenoid activated valves being arranged in series; and

means for coupling said time delay means of each said solenoid actuated valves to the next of said solenoid activated valves so that said second electrical signal of one of said time delay means further provides said first electrical signal to the next of said solenoid actuated valves.

3,989,067

BUOYANT HOSE

Charles C. Gates, Jr., Denver, Colo., assignor to The Gates Rubber Company, Denver, Colo.

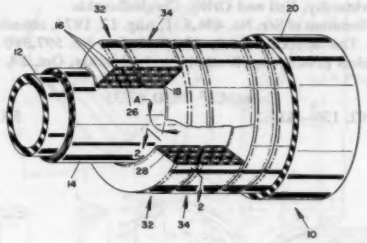
Filed Dec. 11, 1974, Ser. No. 531,659

Int. Cl.² F16L *11/00*

U.S. Cl. 138—129 **7 Claims**

1. In a buoyant hose of the type having a carcass reinforced tube, integral float chambers, and a cover, the improvement of the integral float chambers comprising:

at least two successive plies of tubing, each ply of tubing comprising a plurality of individual tubes helically extending in the same direction at generally a constant helical angle and disposed between the carcass reinforced tube and cover to define a plurality of integral float chambers, each successive ply of tubing axially offset from and adapted to substantially nest at a larger radius with its preceding ply of tubing to define successive layers of tubing; and



a ply of elastomeric material interpositioned between each successive ply of tubing.

3,989,068

AUTOMATIC CONTROL APPARATUS FOR WEAVING MACHINE

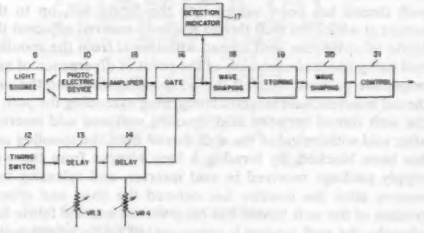
Arao Kakinaka, Nishinomiya, Japan, assignor to Toyo Boseki Kabushiki Kaisha, Japan

Filed Sept. 24, 1975, Ser. No. 616,176

Claims priority, application Japan, Sept. 28, 1974, 49-111861; Mar. 10, 1975, 50-29267

Int. Cl.² D03D *51/28*

U.S. Cl. 139—353 **15 Claims**



1. An automatic control apparatus for a weaving machine wherein warp is shedded for each weaving operation comprising;

means for detecting improperly shedded warp,

means responsive to said weaving operation for generating a timing signal at a predetermined phase of said weaving operation,

means responsive to said timing signal for providing a gate control signal, said gate control signal having a predetermined phase, with respect to said weaving operation, defined by the leading and trailing edges thereof,

means provided in operative association with said gate control signal providing means for setting said phase of said gate control signal,

means responsive to said gate control signal for gating an output from said warp detecting means, and

means responsive to an output from said gating means for automatically controlling the on-off operation of said weaving machine.

3,989,069

METHOD OF AND APPARATUS FOR COMPENSATING FOR WEFT TENSION IN TRAVELING-WAVE SHEDDING LOOMS

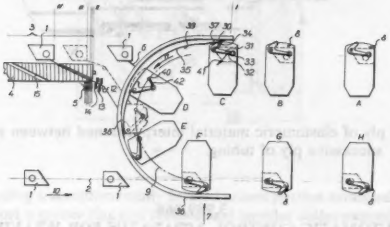
Karel Hrdina; Jaroslav Dostal, and Vaclav Borovec, all of Usti nad Orlici, Czechoslovakia, assignors to Vyzkumny Ustav Bavinarsky, Usti nad Orlici, Czechoslovakia

Continuation of Ser. No. 496,831, Aug. 12, 1974, abandoned. This application July 18, 1975, Ser. No. 597,390

Claims priority, application Czechoslovakia, Oct. 24, 1973, 7319-73

Int. Cl.² D03D *47/35*

U.S. Cl. 139—436 5 Claims



1. A method of compensating for weft tension in the region between a fabric selvedge and weft thread spooling units in a traveling-wave shedding loom wherein the weft spooling units follow an endless path of which one portion extends in common with another endless path followed by weft thread inserters containing a weft supply package, said weft tension compensation taking place after the respective weft thread spooling unit and the weft thread inserter have left each other and after the latter has entered a weaving shed as well as after the weft thread has been woven into the fabric fell, up to the instant at which the weft thread has been severed adjacent the fabric selvedge, the weft thread withdrawal from the spooling unit being blocked upstream of the point of divergence of said respective paths of the weft thread spooling units and the weft thread inserters, said method comprising extending the path of the weft thread between said spooling unit and said inserter, after said withdrawal of the weft thread from the spooling unit has been blocked, by forming a loop reserve from the weft supply package received in said inserter, and releasing said reserve after the inserter has entered the shed and after a portion of the weft thread has been woven into the fabric fell, whereby the weft tension is compensated for by straightening the extended weft path in said region up to the instant at which the weft thread is severed.

3,989,070

SYSTEM FOR AND METHOD OF CARRYING OUT WASH-DRAINING, AFTER-DRAINING AND THE LIKE

Lars-Olof Liberg, Gothenburg, Sweden, assignor to Jonkopings Mekaniska Werkstads AB, Jonkoping, Sweden

Filed Mar. 27, 1975, Ser. No. 562,774

Claims priority, application Sweden, Apr. 26, 1974, 7405616

Int. Cl.² B65B *3/04*

U.S. Cl. 141—1 29 Claims

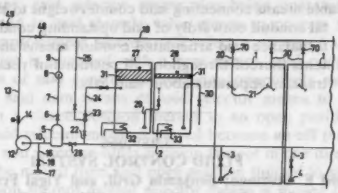
16. In a method of cleaning and emptying a liquid cargo tank on board a ship, the steps of:

A. sucking wash liquid from a wash liquid source by a primary pump;

B. supplying part of said wash liquid to spray means located in said tank;

C. simultaneously supplying another part of said wash liquid to a hydraulic driving means for a secondary rotary pump;

D. sucking from said cargo tank by means of said secondary rotary pump wash liquid expelled by said spray means into said cargo tank;



E. pumping wash liquid to a place of disposal by means of said secondary pump while simultaneously;

F. sucking off gas from the wash liquid entering said secondary pump.

3,989,071

GAS LIGHTER

Adolf Schroder, Kelkheim, and Hans Dieter Klauer, Wehrheim, both of Germany, assignors to Braun Aktiengesellschaft, Frankfurt am Main, Germany

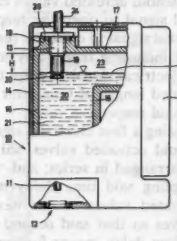
Filed May 28, 1974, Ser. No. 473,813

Claims priority, application Germany, June 18, 1973, 2330960

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² B65B *1/04*

U.S. Cl. 141—294 5 Claims



1. A gas lighter comprising in combination:

a. a tank;

b. a filler valve including a valve housing extending into the interior space of said tank; and

c. a valve stem axially and rectilinearly movable and cooperating with said valve housing;

d. said valve stem being biased by a closure spring, said valve stem having a seal surface, the length of said valve housing being so selected that it extends by a dimension H into the interior space of said tank so that when said lighter is in the filling position there exists a volume in said tank above a plane passing through the lower edge of said valve housing, said tank volume being capable of containing a gas which will accommodate the increase of volume of a liquid gas in said tank due to an increase of temperature within the usual ambient temperature ranges;

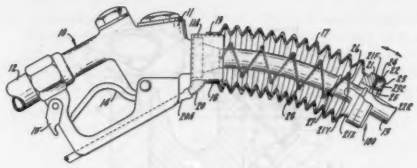
e. said valve stem including a delay device for delaying the closure motion thereof.

3,989,072

NOZZLE SEALING DEVICE AND ASSEMBLY

Frederick L. Voelz, Orland Park, Ill.; Peter P. Moskovich, Gary, Ind., and John N. Novick, Chicago, Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Filed Mar. 31, 1975, Ser. No. 563,881
Int. Cl.² B65B *3/18*
U.S. Cl. 141—311 R 18 Claims



1. A sealing device for use with a liquid dispensing nozzle assembly having a nozzle housing with an elongated discharge spout, a flexible vapor collector surrounding the spout with one free end and the other end attached to the nozzle housing or in proximity thereto, and provided with a means to allow for vapor removal during delivery of liquid from the spout to a liquid receiver inlet which comprises:

face means carried by the free end of said vapor collector for forming a surface seal against the outer surface of said receiver inlet, provided that said spout extends beyond said face means of said vapor collector;

said face means including mounting means located adjacent to said free end of said vapor collector and a flexible member adjacent thereto having an interior chamber, said mounting means and flexible member cooperating to urge said face means against said receiver inlet when said spout is inserted into and said face means contacts said receiver inlet; and

a fluid material substantially filling said interior chamber of said flexible member which allows the flexible member to conform to the geometry of the outer surface of said receiver inlet within a period of time of up to about 30 seconds after said face means is urged against said receiver inlet, retains its fluidity after removal of the spout from the receiver inlet and will provide for pressure redistribution within the flexible member to substantially equalize the pressure against the outer surface of the receiver inlet when the spout and the receiver inlet are not axially aligned at the face means receiver inlet interface, during such contact.

3,989,073

APPARATUS FOR ATTACHING VALVE BAGS TO FILLING SPOUTS OF FILLING MACHINES

Josef Remmert, Vorhelm, Germany, assignor to Bernhard Beumer Maschinenfabrik KG, Beckum, Germany

Filed May 7, 1975, Ser. No. 575,179
Claims priority, application Germany, Feb. 20, 1975, 2507214
Int. Cl.² B65B *1/04*
U.S. Cl. 141—315 32 Claims

1. In an apparatus for mounting valve bags on the filling spout of a material-dispensing filling machine, said apparatus including

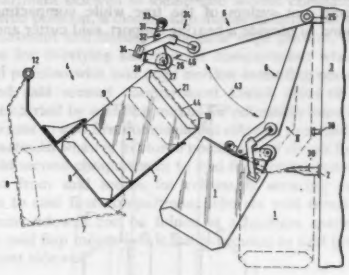
A. bag storage container means capable of holding a plurality of bags, each having a top, a bottom, side walls and valve means;

B. pivot arm means pivotably attached to a locally fixed pivot joint;

C. receiver means, attached to said pivot arm, for receiving one of said bags from said bag storage container means;

D. opening means, attached to said pivotal arm, for opening the valve means of said one of said bags; the improvement comprising:

E. fold-over means, attached to the free end of said pivot arm, for engaging and bending the top of said bag;



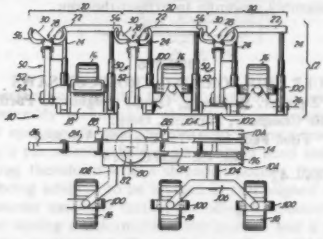
whereby the top of the bag is foleded over so as to be substantially perpendicular to the side walls of the bag and the edges of the top are bent in the direction of the bottom of the bag, the top of the bag thereby assuming a roof-shaped cross-section.

3,989,074

MULTIPLE CUT FELLER

Robert W. Larson, Box 1148, Thunder Bay, Ontario, Canada (P7C 4X9)

Filed May 12, 1975, Ser. No. 576,333
Claims priority, application Canada, May 16, 1974, 200151
Int. Cl.² A01G *23/08;* B26D *5/02*
U.S. Cl. 144—3 D 19 Claims



1. Tree felling apparatus comprising:

a. a mobile vehicle;

b. sensing means on said vehicle for sensing the presence of a standing tree at the forward end of said vehicle as said vehicle moves in a forward direction;

c. felling means movably mounted on said vehicle;

d. means operable in response to sensing of a tree by said sensing means to move said felling means into engagement with the tree sensed by said sensing means; and

e. means for operating said felling means to fell a tree in response to engagement of said felling means with said tree.

3,989,075

TREE HARVESTER

Samuel J. Coughran, Jr., Cedartown, Ga., assignor to Rome Industries, Cedartown, Ga.

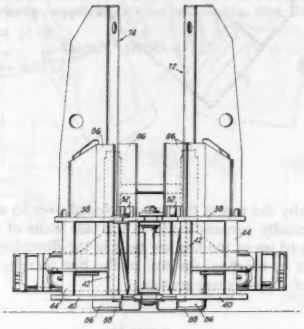
Filed May 30, 1975, Ser. No. 582,363
Int. Cl.² A01G *23/08*
U.S. Cl. 144—34 R 10 Claims

1. A tree extractor comprising, in combination:

a gripper jaw assembly adapted to clamp onto a tree trunk above the ground surface, said gripper jaw assembly

comprising a pair of sections pivoted together to open and close around the tree trunk;

a cutter and foot assembly guided by and movable vertically downwardly below said gripper jaw assembly to sever the lateral root system of the tree while compacting the ground to provide a bearing support, said cutter and foot



assembly comprising a pair of C-shaped cutter shells, one carried by each of said sections to open and close around the tree trunk therewith; and

power driven means acting between said gripper jaw assembly and said cutter and foot assembly for forcing the latter downwardly until the bearing support forces the gripper jaw assembly upwardly to extract the tree.

3,989,076

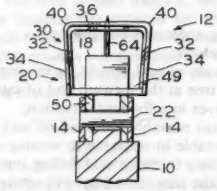
PULP CHIP FORMING CROSSCUT SAWS

James H. Zurcher, Roseburg, Oreg., assignor to Pacific Saw and Knife Company, Portland, Oreg.

Filed Feb. 18, 1975, Ser. No. 550,834

Int. Cl.² B27C *1/14*

U.S. Cl. 144—42 **7 Claims**



1. In a pulp chip forming saw, endless carrier means adapted to be moved in a predetermined direction,

pairs of side slitting plates mounted on the carrier means in spaced positions for cutting the sides of a kerf,

a plurality of raker means mounted between the side slitting plates and each extending substantially completely across the kerf for raking pulp chips out of the kerf,

a plurality of center slitters each positioned in advance of one of the raker means and substantially centered relative to the raker means, and a plurality of depth gauge means mounted on the carrier means in advance of the raker means.

3,989,077

ROTARY CUTTER

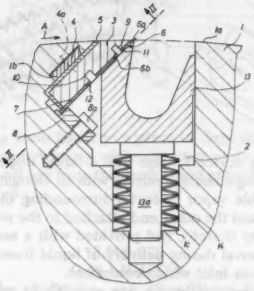
Manfred Humbert, Gutersloh-Isselhorst, Germany, assignor to Maschinenfabrik B. Maier KG, Brackwede, Germany

Filed Mar. 12, 1975, Ser. No. 557,667

Claims priority, application Germany, Mar. 13, 1974, 2411978

Int. Cl.² B27G *13/04*

U.S. Cl. 144—230 **12 Claims**



1. A cutter for removing fragments from wood or the like, comprising a support arrangement mounted for rotation in a predetermined direction, said support arrangement having a peripheral surface, a recess in said surface and holder means disposed in said recess, removable plate-like blade means disposed in said recess, said blade means having a first side adjacent to said holder means, a second side and a cutting edge extending from said recess, said holder means constituting a permanent magnet and said blade means consisting of magnetic material so that said blade means is attracted to said holder means; and a device for biasing said blade means against said holder means.

3,989,078

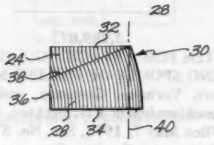
LOG CUTTING AND REJOINING PROCESS

Earl Dean Hasenwinkle, Longview, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.

Filed Jan. 7, 1976, Ser. No. 647,032

Int. Cl.² B32B *3/14*; B27D *1/00*

U.S. Cl. 144—316 **6 Claims**



1. The process for making composite lumber products from generally cylindrical logs comprising the steps of:

longitudinally cutting the logs along radial cutting planes into a plurality of first sector-shaped pieces with the resulting included angle between radial faces being less than 90°;

cutting the first pieces along at least one longitudinal plane of cut that is substantially perpendicular to one of the radial faces, thereby forming second smaller sector-shaped pieces and at least one quadrilaterally shaped piece; and

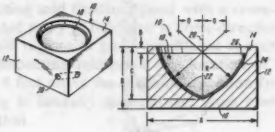
accumulating one second sector-shaped piece and one quadrilaterally shaped piece of similar width dimension and adhesively bonding them together such that a trapezoidally shaped elongated composite member is formed.

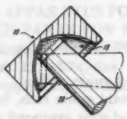
3,989,079

CUE DRESSER

Bill A. Treadway, 1995 E. Ross Road, Tipp City, Ohio 45371

Filed Dec. 17, 1975, Ser. No. 641,648
Int. Cl.² B27L 9/00
U.S. Cl. 145—27 10 Claims





1. A cue dresser comprising:
a. a body portion of light weight material,
b. said body portion having a maximum dimension less than one and one-half inches,
c. a cavity formed in one face of said body portion,
d. said cavity being approximately parabolic in shape with the axis thereof extending into said body portion from said face thereof and with the shape of said cavity being defined by a segment of a circle revolved about said axis with the center of curvature of said circle segment being non-coincident with said axis and offset to the side of said axis opposite said circle segment, and
e. an abrasive covering the surface of said cavity.

3,989,080

CARRYING CASE WITH EXPANDABLE COMPARTMENT

George Koszegi, South Bend, Ind., assignor to Koszegi Leather & Vinyl Products, Inc., South Bend, Ind.

Filed Apr. 21, 1976, Ser. No. 679,036
Int. Cl.² A45C 3/04, 7/00
U.S. Cl. 150—1.7 3 Claims

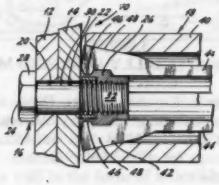
1. In a carrying case having a first compartment defined by sidewall, an access opening into said first compartment, a second compartment having foldable sidewall means for expanding and collapsing said second compartment between usable and stored positions, said second compartment carried by said first compartment and having an access opening therein, the improvement comprising means securing said second compartment at a part of its sidewall means to the sidewall of said first compartment for enabling said second compartment sidewall means to be folded against said first compartment sidewall to locate said second compartment in its stored position, a closure flap means anchored to said first compartment and having a marginal edge portion, said flap means for overlying said second compartment when in its stored position with said edge portion extending peripherally beyond said second compartment folded sidewall means, means carried by said flap means for releasably securing said flap means to said first compartment sidewall over said second compartment when in its stored position, said means for securing said second compartment to said first compartment being spaced from said means for releasably securing said flap means to said first compartment wherein said second compartment sidewall can be folded at a location spaced from where said flap means is releasably secured to said first compartment sidewall.

3,989,081

METHOD AND APPARATUS FOR PRELOADING A JOINT

Jerry A. Sigmund, Willow Grove, Pa., assignor to Standard Pressed Steel Co., Jenkintown, Pa.

Filed Dec. 13, 1974, Ser. No. 532,532
Int. Cl.² F16B 39/02
U.S. Cl. 151—2 R 5 Claims



1. A selectively reusable fastener assembly for preloading a joint assembly including a plurality of workpieces having aligned openings formed therein, said fastener assembly including a pin member having an enlarged head and a shank projecting thereform with a threaded portion thereon, said shank being adapted to be located in said aligned openings, said fastener assembly further including a removable collar member having a deformable outer portion and a relatively hard inner portion including an inner surface, said inner portion being substantially undeformable in a radial direction, said collar member being placed about a portion of said shank and crimped by a radially acting force which displaces material in said outer portion, said inner portion resisting radially inward flow of said displaced material and causing said displaced material to flow axially causing said outer portion of said collar member to elongate and preload the joint, said inner surface being spaced from said shank before and after deformation of said outer portion, whereby said collar member is removable from said pin member after crimping.

3,989,082

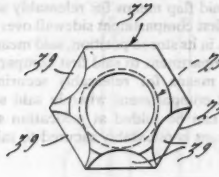
NUT WITH ASYMMETRIC GROOVE MEANS

Tyrus R. Pinchback, Clawson, Mich., assignor to Wilson-Garner Company, Troy, Mich.

Continuation of Ser. No. 230,441, Feb. 29, 1972, abandoned, which is a continuation of Ser. No. 10,940, Feb. 12, 1970, abandoned. This application July 22, 1974, Ser. No. 490,463
Int. Cl.² F16B 39/28
U.S. Cl. 151—34 12 Claims

1. A concentric nut that is reusable and substantially free spinning off and on and having an axis comprising a body having an outer periphery with flats thereon and an inner threaded aperture and an annular flat bearing surface on at

least one end face, said outer periphery, aperture, and bearing surface being substantially coaxial, and the outer periphery being substantially symmetrical in shape with respect to said axis, said outer periphery having separate individual recess means of substantial width and depth in each of a plurality of the flats on substantially only one axial side of the body to



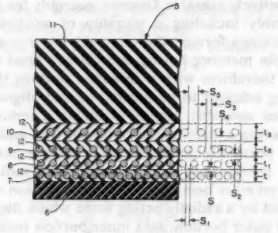
provide said axial side with a substantially lesser mass than the other axial side so that the mass of the nut is asymmetric with respect to said axis to provide for eccentric gripping of several bolt threads when the nut is threaded home on a bolt, said recess means terminating radially outwardly of said aperture end being less than the length of the nut and extending into one end face of the nut.

3,989,083

TIRE WITH SPECIALLY DESIGNED MULTIPLE CARCASS PLIES

Dennis S. Chrobak, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 24, 1974, Ser. No. 482,051
Int. Cl.² B60C 9/06
U.S. Cl. 152—354 **7 Claims**



1. A tire comprising a plurality of carcass plies surrounded by a tread and sidewalls terminating at a pair of beads and characterized in that each carcass ply has:

a. a higher end count per inch of reinforcement cords than that of the next adjacent carcass ply closer the tread;

b. a smaller gauge of rubbery material than that of the next adjacent carcass ply closer the tread; and

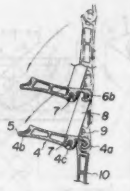
c. lower reinforcement cord angles, measured relative to the centerplane of the tire, than those of the next adjacent carcass ply closer the tread, the gauge of rubbery material of the carcass plies and the end count and cord angles of the reinforcement cords of the carcass plies being such that the reinforcement cords of the carcass plies are uniformly stressed when the tire is mounted on a wheel rim and inflated to the normal inflation pressure recommended by the manufacturer of the tire.

3,989,084

ROLLING SHUTTER

Kosuke Inamura, and Ikira Takasaka, both of Tokyo, Japan, assignors to Bunka Shutter Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 31, 1975, Ser. No. 563,474
Claims priority, application Japan, Mar. 29, 1974, 49-3512549
Int. Cl.² E06B 9/16
U.S. Cl. 160—36 **4 Claims**



1. A rolling shutter comprising:

a shutter case;

at least two upstanding guide rails;

a door slidable along said guide rails, said door including a plurality of elongated slats arranged vertically in a parallel and partially overlapping relationship, each of said slats having pivot pins at both lower side ends thereof projecting outwardly so as to be slidably disposed within said guide rails in unison with, and also with respect to, each other; and

individual actuating means extending between each one of said pivot pins of each one of said slats and predetermined points on successively disposed slats positioned relative to the pivot pins of said successive slats so as to define moment actuating arms with respect to the pivot pin axes of said successive seats, said actuating means being laterally movable, relative to the pivot axes of said slats, said predetermined points,

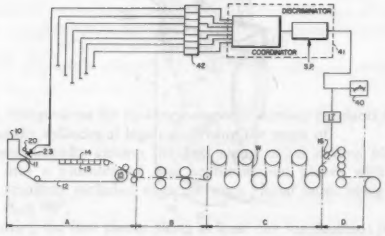
whereby each of said slats may be sequentially pivotally moved when said slats are moved along said guide rails relative to each other by said actuating means.

3,989,085

METHOD AND APPARATUS FOR LEVELING THE CROSS-DIRECTION PROFILE OF STOCK SLURRY ON A PAPERMACHINE

William E. Crosby, Hanahan, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed June 2, 1975, Ser. No. 582,863
Int. Cl.² D21F 1/08
U.S. Cl. 162—198 **18 Claims**



1. A process for leveling the cross-directional distribution of a paper stock constituent deposited continuously within a dilute aqueous slurry upon a machine-direction traveling foraminous screen as the first of several water removal steps in a paper web forming sequence, said constituent leveling process comprising the steps of:

A. Flowing an elongated stream of the slurry from a headbox slice opening onto the traveling screen to form a fluidized pond of said slurry on said screen;

B. Sensing a cross-directional concentration profile of said stock constituent within a paper web consolidated from said slurry;

C. Identifying from said profile, the cross-directional location of substantially stable, machine-direction extending regions of undesirably great concentrations of said stock constituent; and,

D. Impacting said fluidized pond with a cross-directionally elongated spray of fluid that is cross-directionally aligned with said regions of great constituent concentration, said spray impacting said pond at a location of substantially 1.5 to 4 feet along the machine-direction from said slice opening to laterally disperse said great constituent concentration.

3,989,086

METHOD OF AND APPARATUS FOR THE PRODUCTION OF MOLD PARTS FOR FOUNDRIES

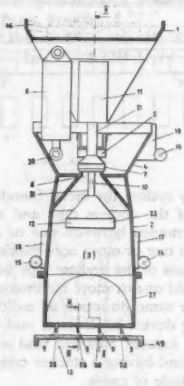
Erwin Bührer, Vogelingasschen 40, Schaffhausen, Switzerland

Filed Sept. 23, 1974, Ser. No. 508,328

Claims priority, application Switzerland, Sept. 26, 1973, 13795/73

Int. Cl.² B22C *15/22*; B65B *1/06*

U.S. Cl. 164—22 **15 Claims**



1. A method for producing foundry mold parts comprising the steps of arranging a storage vessel to contain a volume of granular composition therein and providing an opening in the bottom thereof for allowing the composition to exit, positioning a pressure vessel directly beneath said storage vessel and providing an entrance opening at the top thereof in line with said opening in said storage vessel so that the granular composition may empty into said pressure vessel, arranging a plurality of nozzles protruding from the lower part of said pressure vessel, arranging a core molding device for forming mold parts and having orifices therein directly beneath said pressure vessel with said orifices located to mate with said nozzles for receiving granular composition contained in said pressure vessel, raising said pressure vessel toward said storage vessel by utilization of means operatively engaged between said pressure vessel and said storage vessel for moving said vessels toward and away from each other, opening the entrance of said pressure vessel by operation of opening and closing means for said entrance, filling said pressure vessel with the granular composition by allowing the composition to exit from said storage vessel via the bottom opening into the entrance opening, providing a void in said pressure vessel when said entrance is open by operation of receiver means attached to said opening and closing means for movement therewith, closing the entrance opening of said pressure vessel by operation of said opening and closing means and simultaneously causing said granular material to flow from around said entrance opening into said pressure vessel by causing said receiver means to receive the granular composition when said opening and closing means is operated to close said entrance opening, lowering the pressure vessel toward said core molding device by operation of said means operatively engaged between said pressure vessel and said storage vessel for moving said vessels toward and away from each other, and evacuating the composition in said pressure vessel into said molding device through said nozzles by operation of means operatively connected with said pressure vessel.

3,989,087

MAKING FOUNDRY MOLDS

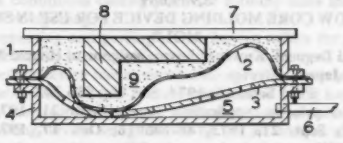
William McCormack, Studley, England, assignor to British Cast Iron Research Assoc., Birmingham, England

Filed June 27, 1974, Ser. No. 483,767

Claims priority, application United Kingdom, June 28, 1973, 30943/73

Int. Cl.² B22C *15/02*

U.S. Cl. 164—37 **1 Claim**



1. A method of forming foundry components comprising carrying out in the order mentioned the steps of first forming a horizontally extending layer of granular refractory material of substantially uniform thickness in an open-topped frame having a bottom wall in the form of a flexible and extensible diaphragm, forcing a pattern into said layer from above with the central portion of said diaphragm being free of support, and, in doing so, stretching said bottom wall, clamping said pattern to the frame, providing a plenum chamber on the opposite side of said diaphragm from said layer, applying gas pressure to said plenum chamber to cause said diaphragm to compact said refractory material against and around said pattern, setting said refractory material to form a solid body, and then separating the resultant body from said pattern and diaphragm.

3,989,088

CASTING MACHINE AND IMPROVED CONTROL CIRCUIT FOR OPERATION

Bernard Weissman, New York, N.Y.; Max Schneiderman, Clifton, N.J., and Alan N. Miller, New City, N.Y., assignors to IPCO Hospital Supply Corporation (Whaledent International Division), New York, N.Y.

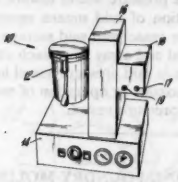
Filed Dec. 29, 1975, Ser. No. 645,093

Int. Cl.² B22D *17/32*

U.S. Cl. 164—157 **20 Claims**

1. In a casting machine having a rotatable casting chamber capable of supporting therein an alloy filled, open-ended container and an investment casting ring having a sprue hole, such that the sprue hole in the casting ring faces the open end of the container, vacuum means for producing a vacuum in the casting chamber, pressure means for providing compressed air into the casting chamber and venting means for venting the casting chamber, the improvement comprising a casting control circuit including, energizing switch means for activating said vacuum means, vacuum timing means activated by said switch means for decoupling said vacuum means from said vacuum chamber after a predetermined first time interval, motor means connected to said casting chamber and

activated by the termination of said first time interval to rotate said casting chamber to an inverted position, pressure timing means activated by the termination of said first timing interval to interconnect said pressure means to said casting chamber for a subsequent predetermined second time interval, said



motor means being further activated by the termination of said second timing interval to return said casting chamber to its initial upright position, and reversing switch means activated by the termination of said second time interval for interconnecting said venting means to said casting chamber.

3,989,089

HOLLOW CORE MOLDING DEVICE FOR USE IN SHELL MOLD

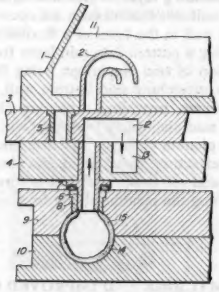
Nobuaki Deguchi, Kuwana, Japan, assignor to Hitachi Metals, Ltd., Japan

Filed Sept. 16, 1974, Ser. No. 506,343

Claims priority, application Japan, Sept. 21, 1973, 48-106015; Sept. 21, 1973, 48-106016; Oct. 17, 1973, 48-119886[U]

Int. Cl.[2] B22C *15/22*

U.S. Cl. 164—201 **5 Claims**



1. A hollow core molding device for use in a shell mold, characterized in that said device comprises:

a sand container having at least one sand injecting pipe;

a movable suction member having at least one sand injecting pipe and a downwardly opened suction chamber, said movable suction member being movable between a first position for communicating said sand injecting pipes with a sand injecting nozzle connected to a core mold for injecting shell sand into a cavity within the core mold and a second position for communicating said downwardly opened suction chamber with an upwardly opened suction chamber in a fixed suction member, said upwardly opened suction chamber communicated with an external vacuum means, and said fixed suction member including said sand injecting nozzle;

such that said shell sand is injected into the core mold when the sand injecting pipe provided in the sand container, the sand injecting pipe disposed in the movable suction member and the sand injecting nozzle disposed in the fixed suction member are in communication with each other, and

unhardened shell sand is removed from said cavity by suction after molding a core when said movable suction member is shifted to thereby communicate the sand injecting pipe of the fixed suction member with said downwardly opened suction chamber of the movable suction member and the upwardly opened suction chamber of the fixed suction member.

3,989,090

CORE SUPPLY SYSTEM FOR METAL FOUNDING

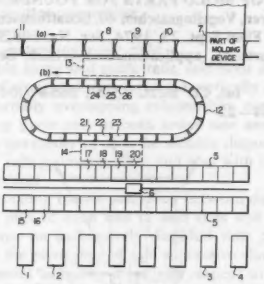
Takashi Kawai, Tokyo, Japan, assignor to Hitachi Metals, Ltd., Japan

Filed Nov. 4, 1974, Ser. No. 520,911

Claims priority, application Japan, Nov. 12, 1973, 48-126252

Int. Cl.[2] B22C *11/04*; B22D *33/04*

U.S. Cl. 164—228 **6 Claims**



1. A core supply system for metal founding wherein core conveyor means of the endless type and at least one core stack-house are arranged between one or more continuous casting devices and one or more core making machines, said core conveyor means of the endless type being located side-by-side adjacent said one or more continuous casting devices and moving in the same direction as molds moving in said continuous casting device or devices, said at least one core stack-house being located adjacent said one or more core making machines and having a stacker crane and being provided with a multitude of cages.

3,989,091

METHOD FOR ELECTROSLAG REMELTING OF TITANIUM OR ITS ALLOYS AND A DEVICE FOR EFFECTING SAME

Boris Izrailevich Medovar, bulvar Lesi Ukrainki, 2, kv. 8; Georgy Anatolievich Pavlichuk, Erevanskaya ulitsa, 8, kv. 8; Viktor Mikhailovich Martyn, ulitsa Vernadskogo, 67, kv. 81; Vadim Markovich Maiorenko, bulvar Druzhby Narodov, 8a, kv. 59; Leonid Mikhailovich Stupak, Brest-Litovsky prospekt, 39, kv. 9, and Viktor Leonidovich Artamonov, ulitsa Sovskaya, 9, kv. 4, all of Kiev, U.S.S.R.

Filed June 5, 1972, Ser. No. 259,821

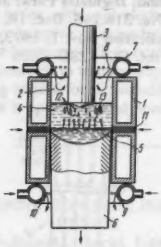
Claims priority, application U.S.S.R., June 7, 1971, 1660809

Int. Cl.[2] B22D *27/02*

U.S. Cl. 164—252 **1 Claim**

1. A device for realizing the electroslag remelting of titanium or its alloys, comprising a cooled mould with walls defining a space, said mould having an upper and lower butt-end; a consumable electrode introduced into the space of said mould; passages made in the walls of said mould and designed to supply the inactive gas into the melting zone; a receptacle secured at the upper butt-end of said mould and designed to

supply the inactive gas onto the surface of the slag bath; a receptacle secured at the lower butt-end of said mould and



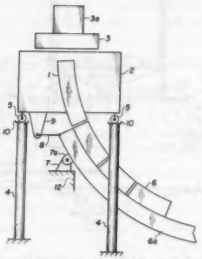
designed for supplying the inactive gas onto the ingot at the point where it comes out of said mould; and a drive for effecting relative displacement of said mould and ingot.

3,989,092

INSTALLATION FOR THE CONTINUOUS CASTING OF A METAL STRAND

Andre Lambin, Marcq-en-Baroeul, France, assignor to Fives-Cail Babcock, Paris, France

Filed Feb. 6, 1976, Ser. No. 655,823
Int. Cl.² B22D *11/14*
U.S. Cl. 164—260 **10 Claims**



1. In an installation for the continuous casting of a metal strand, which comprises an ingot mold having an axis along which molten metal is cast to form the strand, means for oscillating the mold in the direction of the axis, a casing disposed below the mold and surrounding the cast metal strand, a framework supporting the casing, a primary roller apron section mounted in the casing for guiding the cast metal strand, and a curvilinear secondary roller apron section axially aligned with the primary apron section, the secondary apron section including a pivotally-mounted support for the rollers of said secondary apron section for further guiding the cast metal strand, the improvement comprising

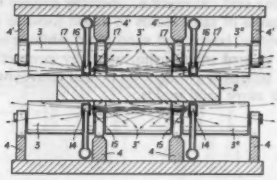
1. coupling means non-ridgedly indirectly connecting the two roller apron sections, the coupling means being arranged between an upper part of the secondary apron section support and an element of the casing, the coupling means being constructed to provide self-alignment of the two apron sections upon a relative displacement between the casing and the secondary roller apron section, and
2. means mounting the casing on the framework for free displacement in a direction transverse to the axis.

3,989,093

CONTINUOUS CASTING PLANT FOR SLABS

Josef Peitl, Haibach; Fritz Gränitz, Linz; Gerhard Reithner, Linz; Wilhelm Dutzler, Linz; Heinz Müller, Leonding; Ernst Bachmer. Linz, and Walter Fortner, Linz, all of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Mar. 14, 1975, Ser. No. 558,330
Claims priority, application Austria, Mar. 18, 1974, 2193/74; Feb. 17, 1975, 1141/75
Int. Cl.² B22D *11/124*
U.S. Cl. 164—283 S **2 Claims**



1. A continuous casting plant for forming slabs from cast strands comprising:

a supporting and guiding means having rollers for guiding the strand between them, and

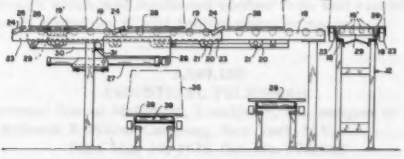
a cooling device having nozzles for spraying a coolant onto the strand and said rollers, said nozzles being supported by said supporting and guiding means, a part of said cooling device being formed by flat jet nozzles with first nozzle openings; said flat jet nozzles being arranged parallel to the broadside of the strand and to the axes of the rollers adjacent them, two of the flat jet nozzles being arranged between each pair of neighbouring rollers with their first nozzle openings being directed opposite and toward each other so that coolant jets are formed which meet in about the middle of the slab, at least some of the flat jet nozzles having second nozzle openings in the opposite direction from their first nozzle openings so that spray is directed toward the strand edges.

3,989,094

APPARATUS FOR PRODUCING CASTINGS FROM FLASKLESS SAND MOLDS

Donald L. Gorenflo, Marion; Dick D. Hendershot, Pleasant Township, Marion County, and Oscar E. Ridenour, Marion Township, Marion County, all of Ohio, assignors to The Fairfield Engineering Company, Marion, Ohio

Filed Jan. 8, 1974, Ser. No. 431,773
Int. Cl.² B22D *5/02*; B65G *25/08*
U.S. Cl. 164—324 **5 Claims**



1. An apparatus for producing castings from flaskless sand molds comprising first conveyor means intersected with second conveyor means, hoist means at said intersection, said hoist means adapted to engage and disengage weights and jackets from sand molds, transfer means at said intersection from said first conveyor to said second conveyor and from second conveyor to mold transfer means, third conveyor means intersecting said second conveyor means, transfer

means from said second conveyor means to said third conveyor at said intersection, fourth conveyor means intersecting said third conveyor means, transfer means from said third conveyor to said fourth conveyor at said intersection, fifth conveyor intersecting said fourth conveyor means, transfer means from said fourth conveyor to said fifth conveyor at said intersection, said fifth conveyor intersecting said second conveyor at a point removed from said intersection of said second and third conveyor means, transfer means from said fifth conveyor to said second conveyor, all of said conveyor means having power means operably connected to a plurality of pivoted pusher means, said pusher means being longitudinally spaced along said conveyor to operably engage the individual bottom boards of sand molds to cause forward movement of each individual board and sand mold while maintaining said boards in spaced relationship whereby contact between the individual boards is avoided; all of said conveyor means being adapted to carry sand molds.

3,989,095

SEMI-CONDUCTOR COOLING SYSTEM

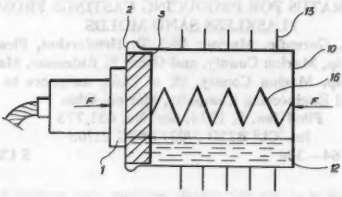
Bohuslav Voboril; Pavel Reichel, and Pavel Kafunek, all of Prague, Czechoslovakia, assignors to CKD PRAHA, oborovy podnik, Prague, Czechoslovakia

Division of Ser. No. 427,225, Dec. 21, 1973. This application July 17, 1975, Ser. No. 596,588

Claims priority, application Czechoslovakia, Dec. 28, 1972, 9004/72

Int. Cl.² H01L *23/40*

U.S. Cl. 165—1 **3 Claims**



1. A method for cooling a semi-conductor device comprising the steps of subjecting the electrode face of said semi-conductor to contact with a yieldable wall of a container, placing a porous member within said container adjacent said yieldable wall and biasing said porous member against said yieldable wall, partially filling the container with a liquid medium in contact with said porous member and causing the heat of said electrode to be dissipated through said wall, said porous member and said liquid.

3,989,096

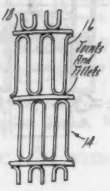
OXIDATION RESISTANT BRAZING

Gordon E. Allardyce, Dearborn Heights; Amedee Roy, and Claude Belleau, both of Troy, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Division of Ser. No. 316,145, Dec. 18, 1972, Pat. No. 3,797,087. This application Nov. 1, 1973, Ser. No. 411,964

Int. Cl.² F28D *19/00*

U.S. Cl. 165—10 **7 Claims**



1. A regenerator core comprising a rim, hub and matrix, the matrix being formed of pieces of metal joined by brazed joints comprised of a copper-aluminum alloy containing up to a maximum of about 15% aluminum by weight, balance essentially copper.

3,989,097

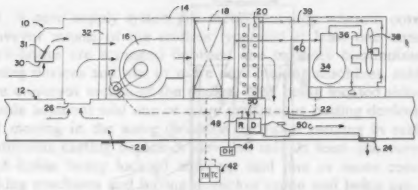
DEHUMIDIFICATION CONTROLS

Walter T. Schildknecht, Madison, Wis., assignor to Marshall Erdman and Associates, Inc., Madison, Wis.

Filed Sept. 27, 1974, Ser. No. 510,050

Int. Cl.² F24F *3/14*

U.S. Cl. 165—21 **2 Claims**



1. An electrical control arrangement for use with a heating-air conditioning unit having air cooling means and air heating means to provide a dehumidification capability by utilizing the air cooling means to cool and dehumidify air and utilizing the air heating means to act as a reheater for the cooled-dehumidified air, the improvement comprising:

said heating-air conditioning unit including means for moving the air and a heat exchanger for heating said air and also including an air cooling evaporator for selectively cooling said air and removing humidity in the form of moisture from said air;

a control thermostat of the automatic switch-over type and including means for presetting a temperature for said air and including means coupled with both the air cooling means and the air heating means for automatic temperature control of said air as required by ambient conditions;

humidity control means having a humidity sensing element and having an electrical switch means;

means coupling said electrical switch means with the humidity control means for operating said switch means in response to humidity of said air;

means, including relay control means, connecting said electrical switch for operation of said air cooling means in response to operation of said switch means by the humidity sensing means;

said relay control means having a coil electrically coupled with said heating means for actuation when the heating means is heating the air; and,

said relay control means having means for switching controlled by said coil and having normally closed contacts connected in series with said electrical switch means of the humidity responsive means whereby actuation of said coil when said heating of air is occuring opens said normally closed contacts to temporarily prevent operation of the air cooling means for dehumidification when the air heating means is operating and heating said air.

3,989,098

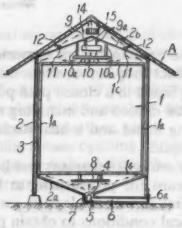
BUILT-IN COMBINATION COOLING AND HEATING DEVICE

Heishi Takasaki, Fujinosaki-Danchi, 1-44-202, 3486 Honmachida, Machida, Tokyo, Japan

Filed May 5, 1975, Ser. No. 574,440

Int. Cl.² F25B *29/00*

U.S. Cl. 165—48 **3 Claims**



1. A built-in combination cooling and heating device for a residential building comprising a ceiling member, wall members and a floor member which define a room of said residential building and are formed of high heat transfer material, an adiabatic outer jacket surrounding said ceiling, wall and floor members in a peripherally spaced relationship thereto to define an air space therebetween and having the upper end portion projecting above said ceiling member and provided with exhaust ports and the lower end portion projecting below said floor member, a heater disposed within said lower end portion of the outer jacket, an air supply tunnel provided below said floor member in communication at the opposite ends with said lower end portion of the outer jacket and an external air supply source, a porous heat radiation plate suspended from said floor member right above said heater, a cooler suspended from said upper end portion of the outer jacket, a porous cooling air dispersion plate suspended from said upper end portion of the outer jacket and positioned right below said cooler and a ventilator provided in the attic defined between the roof of said residential building and said upper end portion of the outer jacket, whereby when said heater is operated, heated air is circulated through said air space from below to above to heat the room and when said cooler is operated, cooled air is circulated through said air space from above to down to cool the room.

3,989,099

VAPOR COOLING DEVICE FOR SEMICONDUCTOR DEVICE

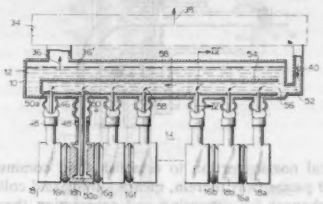
Isamu Hosono, and Yoshiro Shikano, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 17, 1975, Ser. No. 559,392

Claims priority, application Japan, Mar. 16, 1974, 49-30488

Int. Cl.² H01L *23/46*

U.S. Cl. 165—80 **5 Claims**



1. A vapor cooling device for a semiconductor device comprising, in combination, coolant reservoir means having an amount of a condensible coolant in the form of a liquid phase charged therein including a liquid surface within said reservoir, a plurality of heat dissipation blocks disposed below said coolant reservoir means including respective hollow spaces therein, one connection tube member for connecting said coolant reservoir means to each of said heat dissipation blocks thereby to fill said hollow space in the associated heat dissipation block with said coolant in its liquid phase, a plurality of semiconductor elements in compressive contact relationship between adjacent heat dissipation blocks for being cooled through boiling of those portions of said liquid coolant disposed in said hollow spaces, condenser means disposed above said coolant reservoir means and in fluid communication with the latter, said condenser means cooling the coolant in its vapor phase from said hollow spaces in said heat dissipation blocks entering thereinto to condense said coolant into its liquid phase, liquid return means connected between said condenser means and said coolant reservoir and having a coolant inflow port in said coolant reservoir below the liquid surface of the coolant for returning said coolant condensed into its liquid phase back to said coolant reservoir below said liquid surface of the coolant, one auxiliary tube member disposed within each of said connection tube members including an upper end opening into said coolant reservoir means below said liquid surface of the coolant and a lower end opening in said hollow space in the associated heat dissipation block, and return conduit means in said coolant reservoir extending from adjacent said coolant inflow port to each of said auxiliary tube members for supplying to said auxiliary tube members that portion of said liquid coolant adjacent said inflow port through which said condensed coolant from said condenser means is returned to said coolant reservoir means.

3,989,100

INDUSTRIAL TECHNIQUE

Bertrand Norval McDonald, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New York, N.Y.

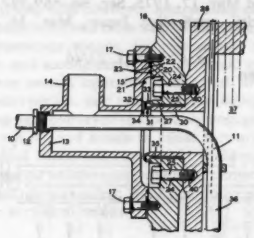
Filed May 19, 1975, Ser. No. 578,963

Int. Cl.² F28F *9/12*

U.S. Cl. 165—81 **2 Claims**

1. A combination discharge nozzle and inlet conduit for supporting a heat exchanger within a nuclear reactor pressure vessel comprising, a generally cylindrical portion on the discharge nozzle, said cylindrical portion having a passageway formed therein, a flange on one end of said cylindrical portion, said flange generally circumscribing said passageway and having means for attaching the discharge nozzle to the reactor

pressure vessel in fluid-tight relation, said cylindrical portion having an aperture formed therein to accommodate the inlet conduit within said passageway to enable the inlet conduit to protrude into the heat exchanger, a collar formed on the heat exchanger that protrudes from the heat exchanger toward said



cylindrical nozzle portion to establish fluid communication with said passageway therein, means joining said collar to the heat exchanger for expansion and contraction therewith in fluid-tight relation, and means associated with said collar for supporting the heat exchanger within the nuclear reactor pressure vessel.

3,989,101

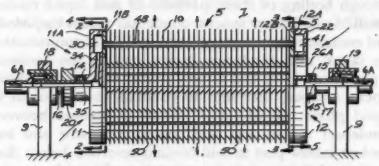
HEAT EXCHANGER

Frank A. Manfredi, 2026 W. 95th St., Cleveland, Ohio 44102

Continuation-in-part of Ser. No. 481,489, June 21, 1974, which is a continuation of Ser. No. 281,542, Aug. 17, 1972, abandoned. This application Mar. 24, 1975, Ser. No. 561,035

Int. Cl.[2] F28D *11/00*; F28F *5/00*

U.S. Cl. 165—86 **16 Claims**



1. A heat exchanger operable between a fluid source and a fluid sink, comprising in combination:

a frame;

a rotor having a first and a second rotor end with aperture means therein;

said rotor including a plurality of fins having central aperture means with said plurality of fins being established parallel to and interposed between said first and second rotor ends;

heat transfer means forming a conduction path between said first and second rotor ends with extends from a region proximate said first rotor end to a region proximate saiid second rotor end a plurality of time and extends from a region proximate said second rotor end to a region proximate said first rotor end a plurality of times;

said heat transfer means having an input proximate one of said rotor ends and an output proximate the other of said rotor ends;

means for connecting said conduction path to one of the fluid source and the fluid sink and for immersing said rotor in the other of the fluid source and the fluid sink to provide energy transfer between said conduction path and the other of the fluid source and the fluid sink;

means for journaling said rotor relative to said frame;

and fan means mounted for movement with said rotor for producing a flow of the other of the fluid source and the fluid sink through said apertures in said first and second rotor ends and between ssaid plurality of fins upon rotation of said rotor to transfer heat between said conduction path and the other of the fluid source and the fluid sink.

3,989,102

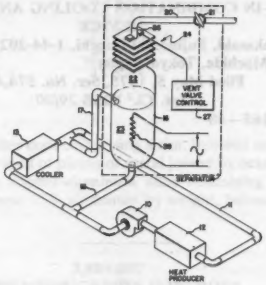
COOLING LIQUID DE-GASSING SYSTEM

Heinz Jaster, and Fred W. Staub, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 18, 1974, Ser. No. 515,838

Int. Cl.[2] F28D *15/00*

U.S. Cl. 165—107 **5 Claims**



1. A forced liquid cooling system comprising

a main cooling duct loop for continuously circulating dielectric cooling liquid in a closed path past heat producing equipment to be cooled and including a pump for pumping said cooling liquid and a heat exchanger for cooling said cooling liquid,

combined continuous gas separator and liquid-gas interface pressurizer means for pressurizing at least a portion of said cooling liquid with dielectric gas and establishing selected physical conditions to obtain preferential evolution of dissolved gas from said cooling liquid, to thereby prevent the formation of bubbles, and said combined separator and pressurizer means elevated above said main cooling duct loop and including auxiliary heating means for heating the cooling liquid circulating therethrough, to thereby establish favorable temperature and pressure conditions for gas evolution.

3,989,103

METHOD AND APPARATUS FOR COOLING AND DEAERATING INTERNAL COMBUSTION ENGINE COOLANT

Joseph T. Cieszko, Richmond Heights, and Charles L. Moon, Brecksville, both of Ohio, assignors to White Motor Corporation, Cleveland, Ohio

Division of Ser. No. 352,414, April 19, 1973, Pat. No. 3,939,901. This application May 15, 1975, Ser. No. 577,882

Int. Cl.[2] F28B *9/10*

U.S. Cl. 165—110 **24 Claims**

1. A radiator construction for a liquid cooled internal combustion engine comprising:

a. a coolant inlet;

b. a coolant outlet;

c. a first header structure communicating with said coolant inlet;

d. a first plurality of coolant passages each having a first end opening communicating with said first header structure;

e. a second header structure into which each of said first plurality of coolant passages opens;

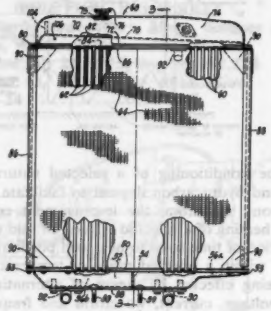
f. a second plurality of coolent passages communicating with said second header structure, each of said second

plurality of coolant passages opening into said second header structure;

g. a third header structure communicating with said coolant outlet, said second plurality of coolant passages opening into said third header structure;

h. said second header structure defining a flow passage means extending transversely of the direction of extent of said coolant passages from said first plurality of coolant passages to said second plurality of coolant passages, said flow passage means defining at least a passage portion having a larger cross sectional flow area than the flow area of said first or second plurality of coolant passages to define a region of substantially quiescent coolant in said second header structure; and

i. a deaeration tube means opening into said passage portion for directing gas detrained from the coolant out of said second header structure.



3,989,104

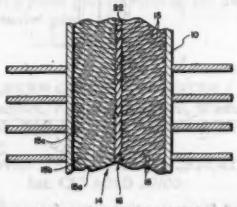
CONDENSER INSERTS

Alwin B. Newton, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed July 13, 1972, Ser. No. 271,442

Int. Cl.² F28B 9/08

U.S. Cl. 165—111 **3 Claims**



1. In combination with a vertical condensing tube of the type where condensate is formed on the interior surface of the tube, the improved insert comprising:

a trunk member, and

a plurality of bristle-like branches attached to the trunk and having differing effective lengths so as to contact the interior surface of the tube in a dense essentially uniform array of pick-up points.

3,989,105

HEAT EXCHANGER

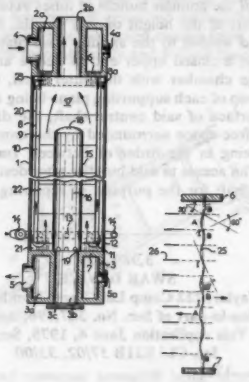
Georges Trepaud, 1 Rond-Point Bugeaud, 75016 Paris, France

Continuation-in-part of Ser. No. 332,761, Feb. 15, 1973, abandoned. This application Nov. 14, 1974, Ser. No. 523,891

Claims priority, application France, Feb. 22, 1972, 72.05913; Nov. 30, 1972, 72.42590

Int. Cl.² F28D 7/10; F22B 1/06; F28F 9/00

U.S. Cl. 165—158 **10 Claims**



1. A large size heat exchanger operating at a high temperature and pressure, particularly of the type used as a steam generator wherein the primary hot fluid consists of the cooling fluid of a nuclear reactor wherein a bundle of heat exchange tubes is arranged in a container, said exchanger comprising:

a. a outer heavy structure including an outer cylindrical shell, an upper head having an outer wall and an inner coaxial wall defining an annular chamber therein and a large central passage, an annular base plate closing the lower end of said chamber and having a plurality of circular rows of perforations, a lower annular head having a shape similar to the upper head and arranged symmetrically relative thereto, whereby its inner coaxial wall defines a large central passage allowing access to the interior of the structure for mounting and repairing said bundle of tubes in situ, removable closing means for closing said passage, the outer wall of each of said heads being provided with an aperture for the intake and the outlet of the fluid circulating through said tubes, said structures having inlet and outlet apertures for a second fluid circulating along the tubes, said outer heavy structure being assembled, welded and stabilized by annealing before the mounting of said tubes,

b. a light inner structure comprising an annular bundle of alike axially undulated planar tubes having a quasi-sinusoidal shape, having successive arcuate deflections in opposite directions with an angle of deflection in the order of 60°, said tubes being arranged in a plurality of circular tube layers and having their upper and lower ends inserted in the perforations of the corresponding annular base plates of said heads and welded thereto, said bundle of tubes comprising a plurality of series of concentric annular supporting hoops arranged on different axially spaced supporting planes respectively, a pair of concentric hoops being arranged eitherside of each circular layer of tubes, each hoop consisting of a plurality of flexible linear elements engaged with one another end-on-end, curved and welded to each other as they are fitted within the outer structure, radially extending tubular braces having concave lateral faces and each inserted between a pair of adjacent tubes in each supporting plane and welded to the outer and to the inner hoops of each

pair of annular hoops arranged eitherside of each circular sheet of tubes respectively to firmly maintain said tubes in said planes without frictional contact between the tubes and the hoops, said tubular braces having substantially the same expansion coefficient as the tubes, the peripheral outer hoop of each supporting plane being attached to the inner surface of the outer shell and the mounting of said circular tube sheets commencing with the peripheral sheet next to the outer shell, a large central shaft made of relatively thin metal sheet arranged in the middle of the annular bundle of tubes extending over the major part of the height of said bundle, having a lower open end welded to the annular base plate of the lower head and a closed upper end to define an annular heat exchange chamber with the outer shell, the peripheral inner hoop of each supporting plane being attached to the outer surface of said central shaft, the diameter of the central free space surrounded by the annular bundle of tubes being in the order of between 1m and 1.5m to provide an access to said bundles after destruction of said central shaft for the purpose of repairing and changing said tubes.

3,989,106
SWAB DEVICE

William T. Taylor, 222 Camp Lilly Road, Humble, Tex. 77338

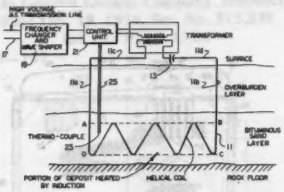
Continuation-in-part of Ser. No. 387,796, Aug. 13, 1973, abandoned. This application June 4, 1975, Ser. No. 583,858
Int. Cl.[2] E21B 37/02, 33/00
U.S. Cl. 166—176 9 Claims

1. An apparatus which is adapted to be incorporated with a body axially movable in a drill pipe with a fluid therein such as drilling fluid or fluid from a downhole formation which fluid tends to cling to the inner wall of the drill pipe and the body is adapted to be moved relatively upwardly or downwardly in the drill pipe to urge an accumulation of fluid in the pipe in a direction determined by the body and the present apparatus is carried into contact with the fluid in a controlled manner, the apparatus comprising an encircling resilient member having an external resilient lip adapted to wipe against the inner wall of the pipe on relative axial movement of said body in the pipe, said member fitting about the body and including integrally joined resilient strap means extending from said lip to an anchor means relatively fixing one end of said strap means and constraining said lip spaced outwardly of said resilient member for wiping movement and wherein said strap means accomodates a limited range of relative flexure of said lip as said lip encounters an internal upset in the drill pipe which requires flexure of said lip and said strap means prevents said lip from lodging and hanging against the upset.

3,989,107
INDUCTION HEATING OF UNDERGROUND HYDROCARBON DEPOSITS

Sidney T. Fisher, 53 Morrison Ave., and Charles B. Fisher, 2850 Hill Park Road, both of Montreal, Quebec, Canada

Filed Mar. 10, 1975, Ser. No. 556,545
Int. Cl.[2] E21B 43/24, 43/25
U.S. Cl. 166—248 9 Claims

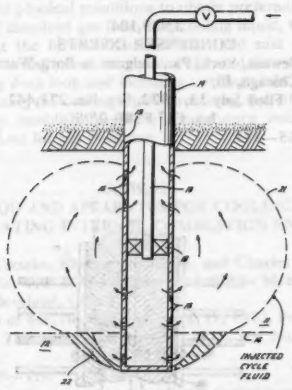


1. In the conditioning of a selected naturally-occurring underground hydrocarbon deposit to facilitate extraction of hydrocarbons therefrom, the improvement comprising the induction heating of a selected portion of said deposit in situ over a period of time so as to heat said portion to a temperature lying within a selected range of temperatures, the said heating being effected by means of alternating current of selected voltage, current, waveform and frequency, passed through a conductor substantially encompassing said selected portion.

3,989,108
WATER EXCLUSION METHOD FOR HYDROCARBON PRODUCTION WELLS USING FREEZING TECHNIQUE

Joseph C. Allen, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.

Filed May 16, 1975, Ser. No. 578,244
Int. Cl.[2] E21B 43/16, 43/24
U.S. Cl. 166—302 10 Claims



1. A method for preventing water from entering a well in communication with a subterranean hydrocarbon reservoir wherein the well is completed in a hydrocarbon reservoir that contains a water column underlying the hydrocarbon column, the completion being accomplished in such a way that fluid can be injected into the lower portion of the reservoir through the well without communicating inside the well with fluid being produced through the well from the upper portion of the reservoir comprising:

a. injecting a cold fluid into the lower portion of the reservoir through the well while producing at about the same

volumetric rate through the well from the upper portion of the reservoir in such a way that heat is removed from the water column freezing the water in the portion of the water column nearest the wellbore; and

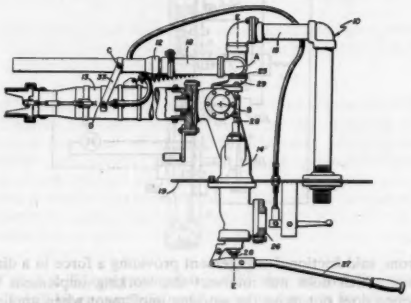
b. reducing the fluid injection rate to a level which will maintain the ice formed in (a) while maintaining a fluid production rate about the reduced fluid injection rate to produce reservoir hydrocarbons diluted with the injected fluid.

3,989,109

FIRE FIGHTING TURRET

John P. Gagliardo, Shrewsbury, Mass., assignor to Feecon Corporation, Westboro, Mass.

Filed July 21, 1975, Ser. No. 597,570
Int. Cl.² A62C *27/16*; B05B *15/06*
U.S. Cl. 169—24 **8 Claims**



1. Fire fighting turret, comprising

a. a fixed inlet pipe,

b. a barrel having an outlet nozzle at one end,

c. a first 90° elbow having one leg fixedly attached to the pipe,

d. a second 90° elbow having one leg attached by a first swivel joint to the other leg of the first elbow, the second 90° elbow being provided with an integral base which is fastened to a table which is mounted on a main base for pivotal movement selectively about a vertical axis and about a horizontal axis,

e. a third 90° elbow having one leg attached by a second swivel joint to the other leg of the second elbow, and

f. a fitting having one end fixedly attached to the other leg of the third elbow and having the other end fixedly attached to the other end of the barrel, the centerline of the barrel lies in a plane passing through the axis of rotation of the first swivel joint.

3,989,110

GREEN ONION HARVESTER

Harold Gene Medlock, P.O. Box 8, Pasco, Wash. 99301, and Herman Frank Ragsdale, 176 Sherwood Drive, Salinas, Calif. 93901

Filed Nov. 25, 1974, Ser. No. 524,421
Int. Cl.² A01D *27/00*
U.S. Cl. 171—28 **6 Claims**

1. A mobile harvester mounted upon a self propelled vehicle for harvesting one or more rows of green onions and including a pickup assembly, a slanted conveyor, a further conveyor and a collection tray, said harvester comprising:

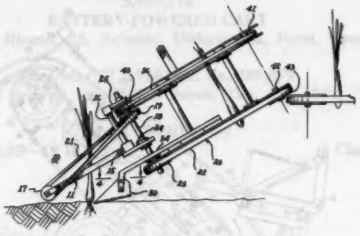
a. said pickup assembly having at least one pair of arms extending downwardly and forwardly of the vehicle for bracketing one of the rows of green onions, said pickup assembly including:

i. a first vertically oriented pulley rotatably mounted at the forward extremity of each arm of said pair of arms;

ii. a second pulley oriented orthogonal to said first pulley and rotatably mounted within the forward end of said slanted conveyer assembly;

iii. a belt extending about said first and second pulleys, said belt being spirally oriented by said first and secon pulleys; and

iv. means for driving one belt of said pair of belts in a first direction and the other belt of said pair of belts in another direction; whereby, the spiral orientation of each belt of each said pair of belts produces convergence of said pair of belts to draw the foliage into and between said pair of arms and said pickup assembly serially withdraws the green onions from the soil and transports them upwardy and toward the vehicle;



b. said slanted conveyer assembly being attached to the vehicle in proximity to the front thereof for supporting said arms of said pickup assembly, receiving the vertically oriented green onions from said pickup assembly and transporting them upwardly onto the vehicle while maintaining them vertically oriented, said slanted conveyer assembly including:

i. a plurality of blades attached to said slanted conveyer assembly and extending forwardly of the vehicle, each said blade being in general alignment with a row of green onions and being vertically disposed beneath the bulbs of the green onions for severing the green onion roots and facilitate withdrawal of the green onions from the soil;

ii. a plurality of first and second vertically displaced but axially aligned pairs of belts for receiving the green onions withdrawn by said pickup assembly and discharging the green onions at the end of said slanted conveyer, each of said first and second pairs of belts being mated with one of said pairs of arms;

iii. each of a plurality of pairs of pulleys being rotatably mounted upon said slanted conveyer for supporting said first pair of belts and maintaining portions of said first pair of belts in resiliently yielding contact with one another to receive and retain the stem of the foliage of the green onions transported by the mated ones of said pair of arms at or before discharge of the green onions from said pickup assembly and bruise the base of at least the lowermost leaf forming the foliage;

iv. each of a further plurality of pairs of pulleys being rotatably mounted on said slanted conveyer for supporting said second pair of belts and maintaining said second pair of belts spaced apart from one another to receive and guide the foliage of the green onions released by said pickup assembly while the green onions are gripped and transported by said first pair of belts;

c. a further conveyer assembly for transporting the green onions to a discharge end of said further conveyer while maintaining them vertically oriented, said further conveyer assembly being mounted on the vehicle in proximity to the discharge end of said slanted conveyer assembly and having one set of belts for receiving the vertically oriented green onions transported by each said first and second pair of belts of said slanted conveyer assembly;

d. a collection tray attached to the vehicle in proximity to the discharge end of said further conveyer assembly for receiving the green onions transported by said further conveyer assembly; and

e. motive means for energizing the belts of said pickup assembly, said slanted conveyer assembly and said further conveyer assembly.

3,989,111

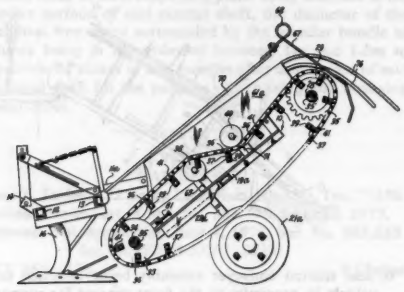
DIGGER-SHAKER

Oliver K. Hobbs, Box 1306, Suffolk, Va. 23434

Filed Mar. 8, 1971, Ser. No. 122,029

Int. Cl.² A01D *29/00*

U.S. Cl. 171—101 **19 Claims**



1. In a peanut digging apparatus adapted to remove peanut laden plants from the soil in which they grew, elevate the plants and then discharge the plants from their elevated position to the ground in windrows behind the apparatus, means connected to the rear of the apparatus for arranging the plants in a single windrow with peanuts spaced away from the soil which comprises a pair of spaced continuous belt carriers having an upper portion adapted to intercept the plants as they fall towards the soil from their elevated positions and a lower return portion, means for rotating the carriers with the upper portion moving rearwardly from the apparatus, and means on said carriers for supporting those portions of the plants near the roots thereof and for moving the plants rearwardly with the carrier while permitting the remainder of the plants to extend unsupported between the two carriers until they are discharged to the ground at the posterior end thereof.

3,989,112

MOTOR GRADER DRAWBAR ASSEMBLY WITH FLUID-OPERATED CYLINDERS FOR RESTRAINING CIRCLE GEAR

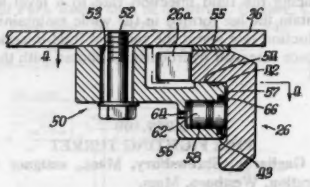
Carroll R. Cole, and Gene B. Easterling, both of Decatur, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

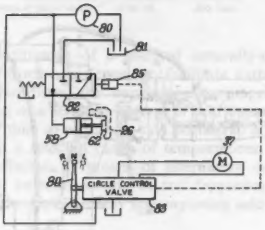
Filed July 9, 1975, Ser. No. 594,397

Int. Cl.² E02F *3/85*

U.S. Cl. 172—796 **7 Claims**

1. In a drawbar assembly for use on a motor grader or the like including: a drawbar frame; a circle gear mounted on the frame for rotation about an axis; a working implement disposed generally crosswise of the circle gear axis; means interconnecting the implement and the circle gear; and drive means operative to rotate the circle gear and hence move the working implement; characterized by the circle gear having a generally smooth surface parallel to its axis and crosswise of the working implement; a plurality of fluid-operated cylinders each having a movable wall therein disposed adjacent said circle gear surface; mounting means for mounting the cylinders on the drawbar frame at locations spaced circumferentially of the circle gear; and means for selectively moving the cylinder walls between one position in frictional engagement with said circle gear surface to restrain the circle gear against movement and a second disengaged position removed therefrom; said frictional engagement providing a force in a direction which does not intersect the working implement and hence does not move the working implement when applied.





3,989,113

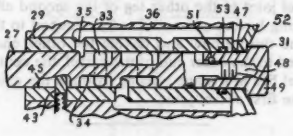
PNEUMATIC TOOL HAVING A REVERSE AIR CONTROL VALVE WITH AN INTEGRAL REGULATOR

Edward F. Spring, Sr., Mohawk, and Raymond J. Schaedler, Utica, both of N.Y., assignors to Chicago Pneumatic Tool Company, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 607,377

Int. Cl.² F01D *1/30*

U.S. Cl. 173—163 **14 Claims**



2. A pneumatically powered nut running tool comprising an air driven reversible motor, a throttle valve for admitting supply air to the tool, and a control valve disposed between the throttle valve and the motor selectively slidable for communicating supply air from the throttle valve to either a forward or a reverse driving side of the motor, the control valve being manually slidable in a forward direction to a first position in which it allows a full volume air flow from the throttle valve to a forward driving side of the motor and being manually slidable in an opposite direction to a second position in which it allows a full volume air flow from the throttle valve to a reverse driving side of the motor, and manually adjustable means effective only for limiting the extent of manual movement of the control valve in the forward direction to a third position short of the first position in which third position the control valve allows a restricted volume air flow from the throttle valve to the forward driving side of the motor.

3,989,114

CIRCULATION SUB FOR IN-HOLE HYDRAULIC MOTORS

John E. Tschirky, Long Beach, and Gary M. Crase, Cypress, both of Calif., assignors to Smith International, Inc., Newport Beach, Calif.

Filed Mar. 17, 1975, Ser. No. 559,035
Int. Cl.² E21B 3/12
U.S. Cl. 175—107 7 Claims

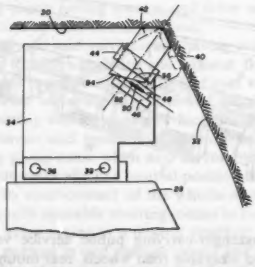
7. In a drill string comprising, drill pipe, an in-hole motor and a drill bit connected to said motor and means for circulating drilling fluid through a drill string including an in-hole motor positioned in a bore hole, means to circulate drilling fluid through the drill string and through said motor and to return said drilling fluid through the annulus between the bore hole and said drill string, the improvement which comprises means to interrupt the passage of the drilling fluid through said motor and continuing the introduction of drilling fluid into the drill string, means to open a bypass for drilling fluid from said drill string into the annulus without passing through said motor, and means to close said bypass, and to pass fluid through said motor.

3,989,115

ADJUSTABLE GAGE CUTTER SCRAPER FOR TUNNELING MACHINES

Albert Robin Ambrose, Beaumont, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed July 10, 1975, Ser. No. 594,920
Int. Cl.² E21B 9/22
U.S. Cl. 175—384 5 Claims



1. In an earth boring machine for producing a bore in earth formations wherein portions of the formations are broken away causing the portions of the formations of fall to the bottom of the bore, said machine including a body portion and a rotary head that rotates about a central axis of rotation, the improvement comprising:

a gage cutter, said gage cutter including a rolling body portion rotatably mounted on said rotary head;

a scraper blade located on said rotary head that rotates with said rotary head and precedes said gage cutter;

holder means on said rotary head for restraining said scraper blade from movement in substantially all directions other than a radial direction from said central axis of rotation; and

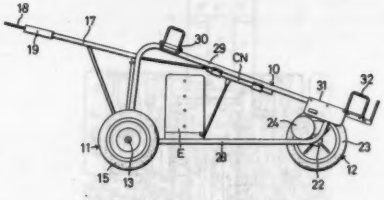
driver means on said rotary head for forcing said scraper blade to move radially within said holder means.

3,989,116

BATTERY-POWERED CART

Fujikiyo Hirano, 78, 3-chome, Midorigaoka, Itami, Hyogo, Japan

Filed May 27, 1975, Ser. No. 580,879
Claims priority, application Japan, Oct. 29, 1974, 49-125866
Int. Cl.² B62D 51/04
U.S. Cl. 180—19 H 1 Claim



1. In a cart designed to be pulled by a person, said cart having a longitudinal frame (10), said frame defining front and the rear cart ends, with at least one cart drive shaft (22) at one end, a motor (24) and an electromagnetic brake (25) coupled to said drive shaft (22) supported on said frame, in combination:

a. first and second electrically conductive guide rods (27, 26) longitudinally supported on said frame between said ends, said rods having connective leads for connection to a battery (E);

b. a sliding member (20) disposed longitudinally for sliding motion along said guide rods (26, 27), first and second slide contacts (N, M) on said sliding member (20), spring means (21) attached to said frame (10) and said sliding member towards said rear end, a rope (18) attached to said sliding member disposed to pull it towards the front end;

c. a brake arrangement consisting of at least first and second brake contacts (B_3, B_2) disposed towards said cart rear end longitudinally along said first guide rod (27) for engagement by said first slide contact (N) including a first circuit having first step resistance means (R_3) coupled to said brake (25) and said first rod (27), said first slide contact (N) closing said first circuit when touching one of said first and second brake contacts (B_3, B_2), the first of said brake contacts (B_3) supplying a greater electromagnetic brake force on said brake (25) via said first step resistance means (R_3) than the second brake contact (B_2);

d. a drive arrangement consisting of at least first and second drive contacts (A_2, A_1) disposed towards said cart front end, longitudinally along said second guide rod (26) for engagement by said second slide contact (M) including a second circuit having second step resistance means (R_1) coupled to said motor (24) and said second rod (26), said second slide contact (M) closing said second circuit when

touching one of said first and second drive contacts (A_2, A_1), the first of said contacts (A_1) supplying a greater amount of power to said motor (24) via said second step resistance means (R_1) than the second drive contact (A_2), whereby when said rope (18) pulls said sliding member (20) from the rear end towards said front end, said brake (25) decreases as said first slide contact (N) moves forward from said first brake contact (B_2) to said second brake contact (B_1), so as to lessen the brake effect on said drive shaft, said motor starting up as said second slide contact (M) touches said first drive contact (A_2) and the drive speed increasing as said slide contact (M) touches said second drive contact (A_1), said actions being reversed as said rope is released and said spring (21) pulls said slide member (20) backwards.

3,989,117

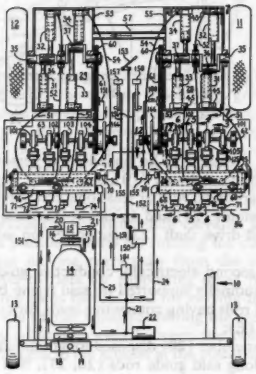
HYDRAULIC DRIVE SYSTEM FOR A WORK VEHICLE OR TRACTOR

Bernard E. Hill, P.O. box 1535, 2437 SW. Olson St., Pendleton, Oreg. 97801

Filed Apr. 14, 1975, Ser. No. 567,735

Int. Cl.² B60K *7/00*; B62D *11/04*

U.S. Cl. 180—66 R **10 Claims**



1. In a vehicle, a pair of drive wheels on opposite sides of the vehicle mounted on a pair of crankshafts, individual hydraulic motors for said wheels having cylinders and pistons connected with said crankshafts, a pair of valve units controlling the flows of hydraulic fluid through the cylinders of the respective motors, a pair of camshafts driven by said motors for operating valves in the respective valve units, a pump supplying a hydraulic drive system including said motors and valve units, and an engine driving said pump, each of said motors having four single acting cylinders, each of said crankshafts having two crank pins in right angle relationship, the pistons in two of said cylinders being connected to one of said crank pins and the pistons in the other two cylinders being connected to the other crank pin, pivotal supports for the head ends of two of said cylinders on one side of said crankshaft, and pivotal supports for the head ends of the other two cylinders on the opposite side of said crankshaft, said crankshaft and pivotal supports all having axes in a common horizontal plane.

3,989,118

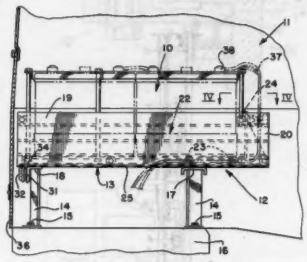
BATTERY SUPPORT WITH ROLL OUT FRAME

Howard A. Hansen, Mossville, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 16, 1975, Ser. No. 623,196

Int. Cl.² B60R *18/02*

U.S. Cl. 180—68.5 **9 Claims**



1. In a vehicle having an electrical system including a battery provided with an upper terminal, improved means for mounting the battery in the vehicle for facilitated maintenance comprising: a base defining a bottom opening a front portion, a rear portion and side portions; a carrier for removably supporting the battery spaced above said bottom opening of the base, said carrier having a rear portion spaced forwardly of said base rear portion to define a rear space in an installed position; means on said carrier and base for guiding the carrier between said installed position overlying the base and a service position forwardly of the base; means for releasably locking the carrier in the installed position; and a flexible battery cable having one end connected to said battery terminal, and a midportion extending downwardly behind said battery through said rear space, forwardly therefrom under said and downwardly through said bottom opening in said installed position, said cable midportion extending substantially directly downwardly behind said battery and between said side portions of the base and downwardly through said bottom opening in said service position.

3,989,119

PUBLIC SERVICE VEHICLE

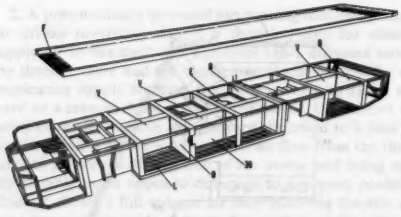
John Billington Cady, Goosnargh, England, assignor to British Leyland UK Limited, London, England

Filed Nov. 22, 1974, Ser. No. 526,212

Claims priority, application United Kingdom, Nov. 24, 1973, 54635/73

Int. Cl.² B62D *23/00*

U.S. Cl. 180—89 R **3 Claims**



1. In a passenger-carrying public service vehicle having front mounted steerable road wheels, rear mounted driveable road wheels and a passenger compartment floor extending over said wheels, the improvement which comprises:

a series of boxes beneath said floor, which floor forms the tops of said boxes while load-carrying floor means forms a bottom for each of said boxes, one of said boxes constitutes an engine compartment, and two others constitute load-carrying compartments,

transverse partitions between said floors defining walls between said boxes, and additional partitions in said boxes extending longitudinally of said vehicle,

said engine compartment being positioned forwardly of the rear wheels,

one of said load carrying compartments being positioned between the engine compartment and the rear of the front wheels and extending over substantially the width of the vehicle, and

the other load-carrying compartment being disposed behind the rear wheels.

3,989,120

POWER STEERING WITH VARIABLE VOLUME SERVO CONTROL

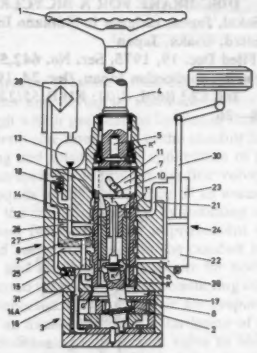
Armin Lang, and Karl-Heinz Liebert, both of Schwabisch Gmuend, Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed Apr. 22, 1975, Ser. No. 570,412

Claims priority, application Germany, Apr. 24, 1974, 2419672

Int. Cl.² B62D 5/06

U.S. Cl. 180—154 15 Claims



1. In a servomotor valve arrangement for operation of a double acting servomotor having a larger and smaller pressure chamber for vehicle wheel steering;

a housing having movable valve means;

manually operable steering means coupled to said movable valve means for actuation thereof upon operation of said steering means;

a metering pump having a rotor and drive means coupled for rotation by said steering means;

said housing and said valve means having coacting valving passages to effect pressure and exhaust flow control of servomotor pressure by actuation of said valve means;

passage means including said coacting housing and valve means having valving passages for effecting transfer of fluid between said pressure chambers and through said metering pump rotor when said servomotor is being returned automatically to a neutral position from a steering position by road contact of the wheels of a vehicle with said manually operable steering means in neutral position and said valve means in a neutral position;

an exhaust passage in said passage means and a check valve therein, biased to close against the direction of exhaust flow therethrough;

said exhaust passage being connected to pressure chambers of said servomotor at the upstream side of said check valve in the neutral position of said valve means whereby said check valve is opened by a drop in pressure when said larger pressure chamber is being filled by transfer of flow from said smaller pressure chamber to supplement flow from said exhaust passage to said larger pressure chamber.

3,989,121

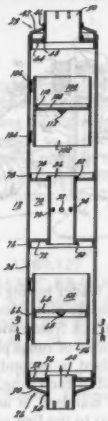
PULSE CONVERTING EXHAUST SILENCING SYSTEM

Arnold A. Bergson, Ann Arbor; Ralph J. Haren, Jackson, and Donald A. Pelton, Grass Lake, all of Mich., assignors to Tenneco Inc., Racine, Wis.

Filed May 14, 1975, Ser. No. 577,408

Int. Cl.² F01N 1/00, 5/00

U.S. Cl. 181—35 B 3 Claims



1. A pulse converter for attenuating sound in pulsating gas flow such as the exhaust gas from a truck engine comprising tabular elongated outer shell of substantially uniform cross section along its entire length and having an inlet end wall at one end and an outlet end wall at the other end, said inlet end wall having an inlet for incoming gas and said outlet end wall having an outlet for outgoing gas, a first tubular elongated inner shell of substantially uniform cross section along its entire length and open at each end, means supporting said first shell in unobstructed alignment with said inlet and so that its entire outer periphery is spaced radially inwardly from the outer shell to define a first annular elongated passage between the outer shell and the first inner shell, said first inner shell having a transverse wall therein at a central location along its length to block gas flow through the first inner shell, said first annular elongated passage being substantially less in cross sectional area than the first inner shell and forming a first peripheral inertance gas flow passage through which gas must flow to pass from the upstream end of the first inner shell to the downstream end of the first inner shell, a second tubular elongated inner shell of substantially uniform cross section along its entire length and open at each end, means supporting said second shell in alignment with said outlet and so that its entire outer periphery is spaced radially inwardly from the outer shell to define a second annular elongated passage between the outer shell and the first inner shell, said second inner shell having a transverse wall therein at a central location along its length to block gas flow through the second inner shell, said second annular elongated passage being substantially less in cross sectional area than the cross sectional area of the second inner shell and forming a second peripheral inertance gas flow passage through which gas must flow to

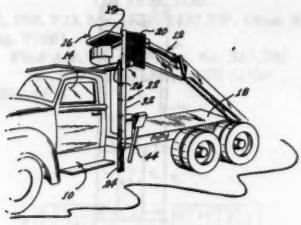
pass from the upstream end of the second inner shell to the downstream end of the second inner shell, the upstream end of the first inner shell being longitudinally spaced downstream from said inlet and the downstream end of the second inner shell being longitudinally spaced upstream from said outlet, substantially the entire cross sectional area of the outer shell along the length thereof between said inlet and the upstream end of the first inner shell forming a gas flow passage for the flow of gas from the inlet to the first inner shell and to the first peripheral inertance passage.

3,989,122

FOLDING LADDER FOR TRUCK MOUNTED LOADER

Richard A. Jenkins, Wilson, N.C., assignor to Omark Industries, Inc., Portland, Oreg.

Filed Oct. 23, 1975, Ser. No. 624,874
Int. Cl.² E06C 5/24
U.S. Cl. 182—84 **1 Claim**



1. A truck mounted loader having an elevated platform and including a foldable ladder comprising; a truck frame, a first standard fixed to the truck frame with its upper end adjacent to the platform, a plurality of rungs pivotally connected at one end to the first standard, a second standard pivotally connected to the other end of each rung, brace means for bracing the rungs and second standard in an extended position with the rungs perpendicular to the first and second standards, said brace means permitting the second standard and rungs to be folded upwardly about the pivotal connection with the first standard to fold said rungs and second standard against the first standard to reduce the width of the ladder, and said elevated platform having a stationary portion and an extended portion with one end of the extended portion pivotally connected to said stationary portion and the other end attached to the second standard whereby said extended portion is folded upwardly about its pivotal connection with the stationary portion when the second standard is folded against the first standard.

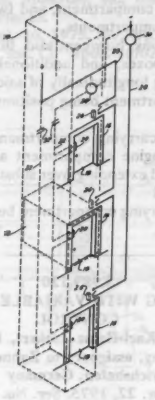
3,989,123

VANDAL PROOF INTERLOCK SWITCH

Dominick Rizzo, Deer Park, N.Y., and Richard J. Conway, Norwood, N.J., assignors to Atlantic Elevator Corporation, Belleville, N.J.

Filed Jan. 17, 1975, Ser. No. 541,889
Int. Cl.² B66B 1/00
U.S. Cl. 187—48 **12 Claims**

1. In an elevator system comprising an elevator shaft, an elevator cab, means for moving the elevator along the shaft, a cab door, means for moving the cab door between an opened and a closed position, a door buck opening into the shaft, a shaft door movable relative to the buck and primary interlock means operatively connected between the shaft door and the cab door moving means and effective, when actuated, to permit actuation of the cab door moving means to close the cab door, the improvement comprising secondary interlock means operatively connected between the shaft door and the primary interlock means and effective, when deactuated to prevent actuation of the primary interlock means and means operatively connecting said secondary interlock means to said shaft door, said connecting means being effective to deactuate



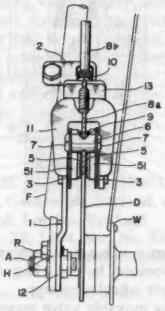
said secondary interlock means when said shaft door is opened.

3,989,124

DISC BRAKE FOR A BICYCLE

Yuji Fujii, Sakai, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Dec. 19, 1975, Ser. No. 642,592
Claims priority, application Japan, Dec. 24, 1974, 49-3298
Int. Cl.² B60L 3/02; F16D 55/22
U.S. Cl. 188—26 **7 Claims**



1. A disc brake for a bicycle or the like, comprising: a disc rotatable with a wheel of the bicycle or the like; a fixed member which has two faces opposite both surfaces of said disc, respectively, and is securable to a frame member of said bicycle or the like; and two arms, between said two faces and said disc, respectively pivoted to said fixed member in the relationship that said arms freely swing with respect to said fixed member and are movable toward said disc, said arms having bases with pads for contact with said two surfaces of said disc, respectively, and extending outwardly radially of said disc to form extensions, respectively, said extensions being subjectable to an external force at their foremost ends thereof, wherein said arms swing around the pivots in the same direction as the forward rotation of said wheel, and at least one of each of said arms and each of said faces of said fixed member opposite thereto is provided with a recess, said recess having a rolling member received therein and being formed of a tapered face at the rear side of said recess with respect to the

arm swinging direction so that when an arm swings said rolling member may be rolled along said tapered face to allow said base of said arm to be shifted toward said disc and said pad to be brought into contact with a surface of said disc to thereby exert a braking action.

3,989,125

ANTI-LOCKING CONTROL ARRANGEMENT

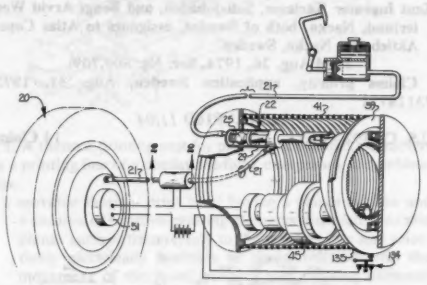
Jan-Olov Martin Holst, Skogsduvevagen 14, S-75252 Uppsala, Sweden

Filed Feb. 4, 1976, Ser. No. 655,222

Claims priority, application Sweden, Feb. 19, 1975, 7501881

Int. Cl.² B60T 8/087

U.S. Cl. 188—181 A 10 Claims



1. In a hydraulic pressure actuated brake for slowing a rotating member and having an anti-lock control including a conduit through which pressurized hydraulic fluid is supplied to a brake, a first valve interposed in the conduit for controllably interrupting and releasing the application of pressure, an oscillating mass-spring actuator for the first valve, and a sensor which responds to the occurrence of an excessive rate of retardation of the rotating member by initiating operation of the actuator and first valve, that improvement which comprises a second valve interposed in the conduit intermediate the first valve and the brake, and means for normally maintaining said second valve in pressure conducting condition and operatively connected with the sensor for responding to the occurrence of an excessive rate of retardation of the rotating member by conditioning said second valve to block conduction to the brake of increased fluid pressure while allowing ydraulic fluid to flow away from the brake through said second valve.

3,989,126

RESILIENT RAILWAY DISC BRAKE PIVOTAL MOUNTING

Ernst Katzer, Munich, Germany, assignor to Knorr-Bremse GmbH, Munich, Germany

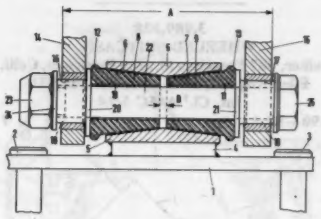
Filed Sept. 25, 1974, Ser. No. 509,033

Claims priority, application Germany, Sept. 28, 1973, 7335128

Int. Cl.² B61F 13/36; F16C 13/06, 27/06; F16D 65/04

U.S. Cl. 188—206 R 2 Claims

1. In a resilient pivot mount for a cross member upon the ends of which are pivotally mounted brake levers having brake shoes thereon engageable with a brake disc on one of the wheel and axle of a railway vehicle, the combination of a pair of space trunion bearings mounted on the frame of the vehicle, a bushing attached to the cross piece, said bushing having a bore whose diameter tapers inwardly from each end thereof toward the center of the bore, a pair of compressible rubber sleeves inserted into said bushing from each end thereof, each rubber sleeve having a cylindrical bore therethrough and a conical peripheral surface tapering inwardly from the outer end of the bushing and an annular bead on the outer end of the sleeve, an axially displaceable sleeve in each trunion bearing and having an external flange engageable with the outer beaded ends of the respective rubber sleeves, a bolt passing through said trunion bearing and rubber sleeves to support said bushing and cross piece from the frame, the inner ends of said rubber sleeves being spaced apart but capable of being



pressed together upon tightening of said bolt, and a metallic tubular member within the cylindrical bore of each rubber sleeve and said bolt passing therethrough, the length of a said tubular member being equal to the length of a said rubber sleeve, the inner ends of said metallic tubular members being spaced from each other so that the compression of said rubber sleeves is limited by the abutting of said metallic tubular members.

3,989,127

HYDRODYNAMIC BRAKE SYSTEM

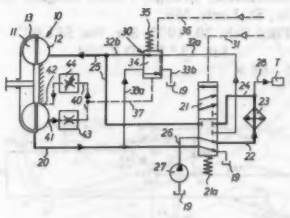
Gerhard Staudenmaier, Konigsbroon-Zang; Berthold Herrmann, Heidenheim (Brenz), and Hein Hellwig, Steinheim, all of Germany, assignors to J. M. Voith GmbH, Heidenheim, Germany

Filed Feb. 21, 1975, Ser. No. 551,840

Claims priority, application Germany, Feb. 23, 1974, 2408876

Int. Cl.² F16D 57/02

U.S. Cl. 188—296 10 Claims



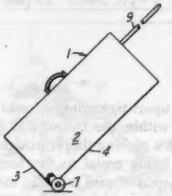
1. In a hydrodynamic brake system, a combination, comprising a stator; a rotor defining with said stator a substantially toroidal liquid-containing working chamber and being rotatable at a plurality of speeds; conduit means for supplying liquid to said chamber through a first port in said chamber and for evacuating liquid from said chamber through a second port in said chamber; adjustable regulating means for controlling the flow of liquid in said conduit means to thus determine the extent to which said chamber is filled with liquid and hence the braking torque of said system; and means for adjusting said regulating means, including a measuring device having an overflow line including a first end portion communicating through a third port in said chamber with a first portion of said chamber and a second end portion communicating through a fourth port in said chamber with a second portion of said chamber in such a way that a continuous stream of liquid flows in said line from said first to said second end portion thereof

when said rotor rotates, and first and second flow restrictor means disposed in said line between said first and second end portions, the pressure of liquid in said line intermediate said flow restrictor means representing a first value which is indicative of the real braking torque of said system, said regulating means including means for comparing said first value with a rated value and for changing the quantity of liquid in said chamber when said first value deviates from said rated value.

3,989,128
WHEELED SUITCASE

Brooks Walker, 807 Francisco St., San Francisco, Calif. 94104

Filed Aug. 29, 1975, Ser. No. 608,921
Int. Cl.² A45C *5/14*
U.S. Cl. 190—18 A **7 Claims**

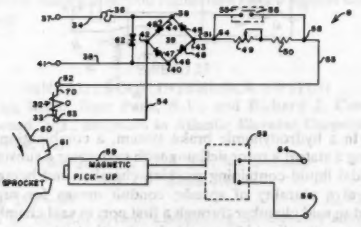


1. In a wheeled suitcase,
an axle,
a wheel rotatably supported at one end of said axle,
a mount secured to the opposite end of said axle with the latter cantilevered therefrom,
means on one of the vertically extending sides of said suitcase forming a socket and receiving said mount therein,
said socket opening outwardly adjacent the bottom side of said suitcase whereby when said mount is received in said socket said axle is adjacent said bottom side and the upper portion of said wheel is above said bottom side.

3,989,129
MODULATED ELECTRIC SLIP CLUTCH

Zane G. Brandenstein, Orange, Conn., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Feb. 20, 1975, Ser. No. 551,077
Int. Cl.² F16D *27/04*
U.S. Cl. 192—84 R **6 Claims**

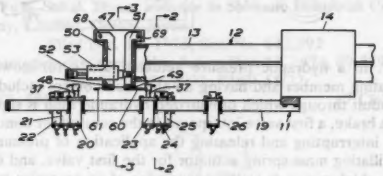


1. In a drive system operatively connected to a conveyor, including gear means operatively connected to said conveyor, and a drive motor adapted to drive said conveyor through said gear means, the improvement which comprises means for providing a soft start to said conveyor upon activation of said drive motor, said soft start providing means being operatively connected between said motor and said gear means, including a clutch assembly having a first member connected to said motor and a second member connected to said gear means, clutch facing means between said first and said second members, said clutch facing means being constructed from a material having a coefficient of friction at 40° C. chosen from a range between 0.198–0.242, said clutch facing material permitting relative rotation of said first and said second members upon activation of said drive motor, means for maintaining said first and said second members in abutment with one another along said clutch facing means, electrical means for increasing the force between said first and said second clutch members, and electric circuit means for varying the voltage applied to said electrical force increasing means between at least a first level and a second higher level during energization of said drive motor.

3,989,130
POSITIONING DEVICE

Kent Ingemar Karlsson, Saltsjobaden, and Bengt Arvid Westerlund, Nacka, both of Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Aug. 26, 1974, Ser. No. 500,709
Claims priority, application Sweden, Aug. 31, 1973, 73118721
Int. Cl.² F16D *11/04*
U.S. Cl. 192—143 **14 Claims**



1. A positioning device comprising:
a first and a second main part which are translatable relative to each other along a linear path,
stop means on said second main part,
first and second guide means on said first main part and parallel with said linear path,
a first stop device slidable along said first guide means and lockable in various positions thereto,
a second stop device slidable along said second guide means and lockable in various positions thereto,
said stop devices each including stop members having inactive positions for permitting free translation between said main parts and being selectively operable into activated positions for engagement with said stop means on said second main part so as to limit relative movement between the main parts in one direction,
a dampening device mounted on said second main part and commonly operable with said first and second stop devices on said first main part to serve as a shock absorber prior to engagement of a stop member with one of said stop means, and
a pressure fluid motor coupled to at least one of the main parts for effecting translatory movement between the main parts until it stalls out when an activated stop member of said stop devices and said stop means on said second main part abut against each other to define a pre-selected relative position between said main parts.

3,989,131

ELECTROTHERMAL PRINTING UNIT

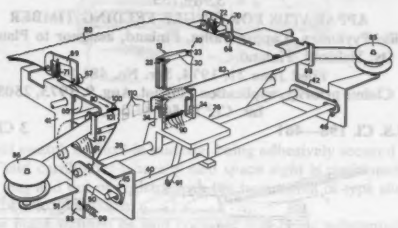
Franco Knirsch, Pavone (Turin); Lucio Montanari, Cascinette (Turin), and Giorgio Rossi, Banchette (Turin), Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Feb. 4, 1975, Ser. No. 547,077

Claims priority, application Italy, Feb. 18, 1974, 67466/74; Jan. 20, 1975, 67111/75

Int. Cl.² B41J *31/02*; G01D *15/10*; H05B *1/00*

U.S. Cl. 197—1 R 9 Claims



1. A thermal printing unit for printing dot-matrix characters on a printing line of a display medium, comprising in combination:

a movable thermal print head having a planar surface and a column of resistive printing elements disposed onto said planar surface transversely to the printing line and selectively electrically heatable in timed relation with the movement of the head, each of said printing elements having a partially cylindrical outer surface concave towards said planar surface, the generatrices of the partially cylindrical outer surface of all the elements being parallel to a common direction transverse to the printing line of the display medium;

means mounting the printing head for continuous movement along the printing line during the printing of a line and for movement towards the display medium in response to pressure applied thereto;

a plastic support material disposed between the printing elements and the display medium;

a coating of material superposed on said support material adjacent to the display medium and transferrable to the display medium in response to a given combination of pressure and heat; and

means acting upon said head for pressing said elements against said support material and said coating against said medium during the movement of the head along the printing line during the printing of a line.

3,989,132

RIBBON STORAGE AND TRANSPORT MECHANISM

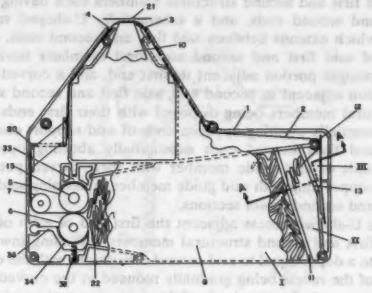
Andrew B. Carson, Jr., Waynesboro, Va., assignor to General Electric Company, Waynesboro, Va.

Filed Aug. 26, 1974, Ser. No. 500,375

Int. Cl.² B41J *33/10*; B65H *23/32*

U.S. Cl. 197—168 20 Claims

1. An inked ribbon cartridge for a printing device comprising an endless ribbon, a housing for storing the major portion of said ribbon, said housing having first and second restrictors dividing the housing into first, second and third portions, a ribbon inlet at one end of said housing and a ribbon outlet at another end of said housing, means for withdrawing ribbon under tension from the outlet and for feeding it to the inlet, said housing having an internal height slightly higher than the width of said ribbon and being of sufficient length such that incoming ribbon arranges itself into folds without tumbling, means for causing folded ribbon to be compressed in said first portion comprising said first restrictor located between said first and second portions for impeding transfer of ribbon from said first to said second portions in response to said means for feeding, means for separating clumps of multiple folds of ribbon from said first portion and decompressing such separated clumps in said second portion comprising said ribbon being in a sufficient amount and said first restrictor being dimensioned such that portions of the compressed ribbon are caused to respond to ribbon tension and trip across the restrictor in clumps into the second portion where the clumps are decompressed, said second restrictor located between said



second and third portions for impeding transfer of separated, decompressed clumps of ribbon from said second to said third portion in response to said means for feeding, and means for enabling ribbon to be withdrawn from said second portion into said third portion as an unfolded strand of ribbon comprising said second restrictor being dimensioned such that the ribbon responds to ribbon tension to bow and/or skew along its width in order to pass the second restrictor.

3,989,133

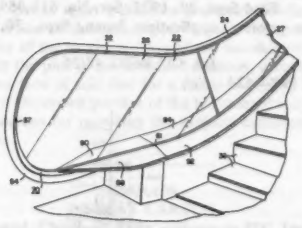
TRANSPORTATION APPARATUS

Iber C. Courson, and Joseph K. Kraft, both of Gettysburg, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 20, 1975, Ser. No. 551,560

Int. Cl.² B66B *9/12*

U.S. Cl. 198—335 8 Claims



1. Transportation apparatus for transporting persons between spaced landings, comprising:

a support structure,

a load bearing conveyor mounted on said support structure,

a balustrade,

means mounting said balustrade on said support structure,

said balustrade including a plurality of vertically oriented panel members aligned in abutting end-to-end relation to define substantially continuous upper and lower edge portions which terminate in first and second newel sections,

a handrail,

handrail guide means for said handrail,

said handrail guide means including a guide member supported by said upper edge portion which extends to and

partially defines said first and second newel sections, said guide member extending inwardly from said upper edge portion for a predetermined first dimension,

said means mounting the balustrade on said support structure including a support channel and first and second structural members,

said support channel extending inwardly from said lower edge portion for a predetermined second dimension which is greater than said first dimension,

said first and second structural members each having first and second ends, and a substantially U-shaped recess which extends between said first and second ends, each of said first and second structural members having a straight portion adjacent its first end, and a curved portion adjacent its second end, said first and second structural members being disposed with their first ends substantially abutting opposite ends of said support channel and their second ends substantially abutting opposite ends of said guide member with their curved portions cooperating with said guide member in defining said first and second newel sections,

the U-shaped recess adjacent the first end of each of said first and second structural members extending inwardly to a depth equal to said second dimension, with the depth of the recess being gradually reduced in the curved portion such that the depth of the recess is equal to said first dimension at the second end, to provide stepless transitional support for said panel members at each of said first and second newel sections between said guide member and said support channel, with the panel members which start at the first and second newel sections extending beyond the abutting ends of the associated structural member and support channel,

and first and second clamping means on said support structure which connect the first ends of said first and second structural members, respectively, to said support channel, and allow the second ends of the first and second structural members to be cantilevered outwardly from said support structure while providing lateral stability in said first and second newel sections.

3,989,134

METHOD AND APPARATUS FOR TRANSFERRING ARTICLES

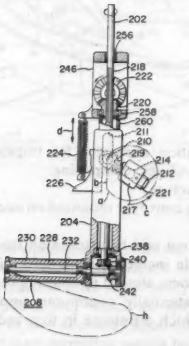
Torahiko Hayashi, 3-4, Nozawa, Utsunomiya, Tochigi, Japan

Filed Sept. 30, 1975, Ser. No. 618,059

Claims priority, application Japan, Sept. 30, 1974, 49-112593

Int. Cl.² B65G 47/26

U.S. Cl. 198—424 **7 Claims**



1. A method of continuously transferring formed articles such as confectionery, bread or the like from a feed conveyor through a displaceable transfer conveyor onto a receiving conveyor, trays or boxes positioned beneath said transfer conveyor, characterized by transferring articles by causing said transfer conveyor to move substantially downwardly at a velocity greater than the falling speed by gravity of the articles thereon, and then swing substantially laterally at a velocity sufficient to avoid contacts with the falling articles thereby to cause the articles to fall onto the receiving conveyor, trays or boxes, and finally return to its original position to receive subsequent articles from the feed conveyor.

3,989,135

APPARATUS FOR SINGLE FEEDING TIMBER

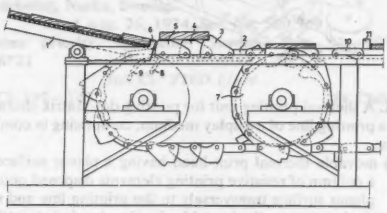
Niilo Pyykonen, Lappeenranta, Finland, assignor to Plan-Sell Oy, Helsinki, Finland

Filed June 21, 1974, Ser. No. 481,849

Claims priority, application Finland, Aug. 9, 1973, 2508/73

Int. Cl.² B65G 47/26

U.S. Cl. 198—461 **3 Claims**



1. Apparatus for feeding single pieces of timber from a single layer mat of the timber comprising a rigid frame; a first conveyor mounted in the frame for transferring the single layer mat of timber against a stop at the end of the first conveyor; a third conveyor attached to the frame at some distance forward of the stop in the direction of transport; a second conveyor including an endless moving track, said second conveyor being mounted in the frame between the first and the third conveyors for transferring one timber at a time at even intervals, calculated from the front edge of the timber, from the first conveyor to the third conveyor, said second conveyor including timber supporting members fitted to said track so as to move therewith in an endless path, said members adapted to lift a piece of timber retained by the stop and transfer the timber past the stop to said third conveyor; and means fixedly attached to the frame for cooperation with and actuating the timber supporting members to raise the supporting members to supporting positions as they move past the stop.

3,989,136

GUIDE FOR A TYPEWRITER

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Robert D. Dubois, and George T. Pinson, both of Huntsville, Ala.

Filed Aug. 9, 1973, Ser. No. 387,094

Int. Cl.² B47J 29/42

U.S. Cl. 197—188 **2 Claims**

1. An improved guide for use in aligning a sheet of paper preparatory to an application on a target area thereof of typed indicia by a type slug of a typewriter comprising:

a guide base including a swatch of flexible material having a layer of adhesive affixed to one side thereof;

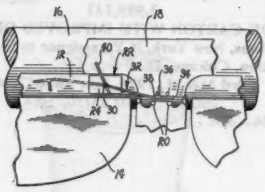
said guide comprising an elongated relatively fine wire pivotally supported by said swatch;

means defining a space sight near one end of said wire including a pair of coplaner orthogonally related legs, and means defining a thumb actuator portion at the end portion of said wire remote from said sight, said pivotal support being located between said thumb actuator por-

tion and said space sight thereby forming a bellcrank lever;

the pivotal axis of said pivotal support being normal to the plane of said swatch and the plane of said legs;

said guide being combined with a typewriter having a cardholder;



said swatch of flexible material being adhesively secured to said cardholder whereby said space sight is positionable into and out of registry with the target area of type slugs of said typewriter;

the plane defined by said coplaner legs being substantially parallel to the plane of said cardholder.

3,989,137

CLAMPING MEANS FOR CONVEYOR MECHANISMS

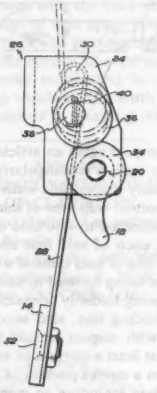
Charles William Ward, 35 Central Blvd., Wheatley Hills, Doncaster, England

Filed Sept. 9, 1975, Ser. No. 611,812

Claims priority, application United Kingdom, Sept. 23, 1974, 41325/74

Int. Cl.² B65G *15/60*

U.S. Cl. 198—836 **9 Claims**



1. In clamping means for the flexible side skirt of a conveyor system, a mounting means; an elongate lever of which one end is connected to said mounting means for pivotal movement relative thereto; a cam member pivotally mounted on said mounting means and adapted to bear against the lever intermediate its ends for causing the free end of said lever to bear against the flexible skirt of the conveyor system; and means for retaining the cam member in abutting relation with the lever, said means including a detent wheel pivotally mounted for movement with said cam member and including also an element acting against the periphery of the detent wheel for allowing movement of the cam member into abutment with the lever but for preventing its movement away from said lever until released from engagement with the periphery of the detent wheel.

3,989,138

ORIENTATION DEVICE FOR SUBJECTS

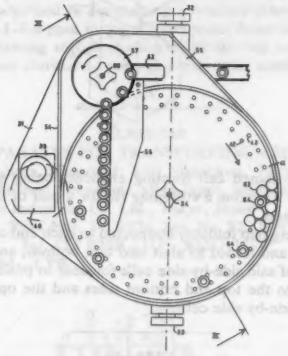
Jakobus Petiet, Leiden, Netherlands, assignor to N.V. Leidsche Apparatenfabriek, Leiden, Netherlands

Filed Aug. 15, 1974, Ser. No. 497,754

Claims priority, application Germany, Aug. 23, 1973, 2342752

Int. Cl.² B65G *47/14*

U.S. Cl. 198—384 **3 Claims**



1. A device for orienting generally round subjects, such as hat-shaped subjects having a crown portion and a brim portion, comprising, in combination, a rotatably mounted disc having an upper surface slanted with respect to the horizontal, means for rotating said disc, a plurality of longitudinally movable pins arranged in first and second circumferentially extending rows adjacent the periphery of said disc, said rows being disposed coaxially with respect to the center of said disc with said pins in said rows being arranged in radially spaced, associated pairs and extending substantially perpendicular to said disc upper surface, means for moving each of said associated pairs of pins reciprocally between the lower and upper regions of said disc and between a retracted position below the upper surface of said disc and an extended position above the upper surface of said disc, said pins in each of said associated pairs being spaced apart a distance less than the diameter of the brim portion of the hat-shaped subjects but greater than the diameter of the crown portion of the hat-shaped subjects and wherein the pins in the extended position, extend beyond the upper surface of said disc for a distance slightly less than the height of the crown portion of the hat-shaped subjects and conveying means for receiving the subjects captured by said pairs of pins.

3,989,139

DISPLAY CARTON

John W. Vargo, Cleveland, Ohio, assignor to FDI, Inc., Cleveland, Ohio

Filed July 29, 1975, Ser. No. 599,983

Int. Cl.² B65D *25/54*, *65/16*

U.S. Cl. 206—45.31 **9 Claims**

1. A display carton for an article of merchandise or the like, said carton being formed from a cut and scored blank of paperboard or the like and comprising:

a. a vertical back panel;

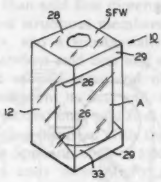
b. side panels foldably connected to opposite sides of said back panel;

c. at least three cell forming elements foldably connected to each other and to each of the ends of each said side panel;

d. a distal closing tab foldably connected to each end of said cell forming elements and secured to a correlative side panel and defining with said cell forming elements when erected a cell at each end of each of said side panels, each

of said cells having a top, a bottom, open ends and two sides; said side panel, said cells having top sides, open ends and bottom sides;

e. said side panels together with said erected cells being folded to position with a cell forming element of each cell in confronting relationship;



said last named cell forming elements being secured together to define a stiffening rib for a pair of side-by-side cells, and

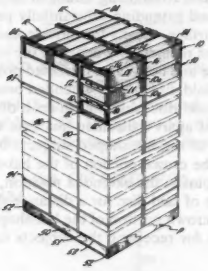
f. a closing flap foldably connected to each end of said back panel and folded to abut said top, bottom, and the open ends of said side-by-side cells foldable to position contiguous to the top and bottom sides and the open ends of said side-by-side cells.

3,989,140

APPARATUS FOR UNITIZING STACKED PRODUCT CONTAINERS FOR SHIPMENT

Walton B. Crane, Sherman Oaks, Calif., assignor to A & E Plastik Pak Co., Inc., City of Industry, Calif.

Filed Mar. 3, 1975, Ser. No. 554,656
Int. Cl.² B65D *21/02*
U.S. Cl. 206—386 **3 Claims**



1. A unitized six column stack of produce containers on a pallet, including two adjacent multiple-tiered sub-columns of containers, in tiers each comprising two parallel, adjacent rows of three containers each, side-to-side, and the stack comprising two sub-columns, with the containers in the two sub-columns positioned end-to-end,

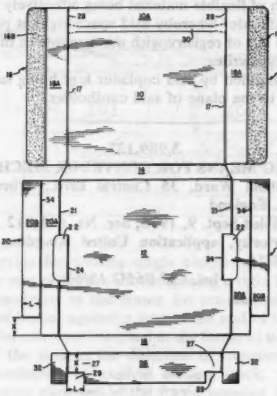
each container includng generally rectangular bottom, side and end walls, and rigid, generally rectangular reinforcing and stacking end frames secured to opposite ends thereof, said end frames each including a generally horizontally extending top member having upwardly facing stacking surfaces at opposite end regions thereof for the engagement with the end frame of the container immediately above, positioning prongs projecting upward above the stacking surfaces, the end frame of the container immediately above having apertures for the reception of said positioning prongs, releasable locking bars extending across the junctions between the outwardly facing end frames of the top containers of the unitized stack of containers, said locking bars being applicable downwardly to said top end frame members and having apertures spaced apart and fitted for relatively tight-fitting reception of said prongs to releasably secure said prongs to said top end frame members.

3,989,141

BOOK CARTON WITH IMPROVED OPENER

Benjamin Rous, New York, N.Y., assignor to Stone Container Corporation, Chicago, Ill.

Filed Mar. 1, 1976, Ser. No. 662,962
Int. Cl.² B65D *85/30*, *5/54*
U.S. Cl. 206—424 **5 Claims**



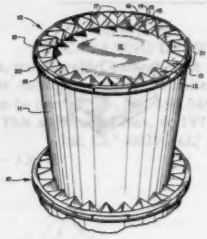
1. In a carton for packaging an article comprising a rectangularly shaped top wall, a rectangularly shaped bottom wall, a pair of trapezoidally shaped side walls foldably connected to each side of said bottom wall, one of said pair of side walls also being foldably connected to one side of said top wall, a first pair of end flaps, each of said first end flaps being foldably connected to one end of said bottom wall along a first folding line, a pair of tabs being formed in said bottom wall, each of said pair of tabs being foldably connected to said bottom wall along a second folding line, said second folding line being spaced inwardly with respect to said bottom wall from said first folding line, at least a portion of each of said pair of tabs being formed from a cutout portion of said bottom wall, each of said first end flaps including an inner portion and an outer portion, said inner portion being foldably connected to said outer portion along a third folding line, said end flap inner portion being foldably connected to said bottom wall and being coextensive in length with said bottom wall, the improvement comprising said first end flap outer portion being a first predetermined amount (X) shorter in length than said end flap inner portion, said first end flap outer portion being equal in width to a second predetermined amount (L), a closure flap being hingedly connected to the other of said pair of side walls, said closure flap having a pair of end portions extending inwardly from the ends of said closure flap a distance equal to the second predetermined amount (L), said closure flap end portions being equal in width to the first predetermined amount (X), said closure flap and said first end flap outer portions being normally positioned parallel to said bottom wall and being coplanar with each other.

3,989,142

STACKABLE CONTAINER LID

James L. Gwilliam, Jr., and Warde Mitchell Cameron, Jr., both of Salt Lake City, Utah, assignors to Plastronics Corporation, West Jordan, Utah

Filed Oct. 15, 1975, Ser. No. 622,659
Int. Cl.[2] B65D *21/02, 43/10, 51/16*
U.S. Cl. 206—508 10 Claims



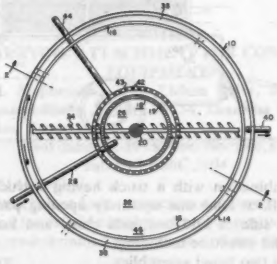
1. A semiflexible container lid comprising a generally circular lid having a circular center portion surrounded by a continuous series of polyhedrons, each consisting of an upwardly projecting arcuate triangular inner surface and an inwardly projecting inclined triangular upper surface, the points of juncture of said triangular surfaces forming an apex, the sidewalls of each polyhedron sloping outwardly and away from the edges of the triangular surfaces depending from the apex to form an irregular rectangle, each sidewall adjoining the sidewall of an adjacent polyhedron at the bottom edge thereof to form a valley which valley extends from the perimeter of the circular center portion to a backwall portion defined by the space between the sloping adjoining sidewalls, said backwall portion being contiguous with the back edges of said sloping sidewalls, the back edge of said upper triangular surface and the top edge of said backwall portion being bounded on the outside by a contiguous border adapted to rest on the rim of a container, said border terminating in a downwardly and inwardly extending lip which is sufficiently flexible to expand over the rim of a container in a sealing relationship.

3,989,143

UPPER STRATA CHLORINATION OF UPPER SECTIONS OF CLARIFIERS

Joseph Tracy Broussard, Luling, La., assignor to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 488,369, July 15, 1974, abandoned. This application July 2, 1975, Ser. No. 592,591
Int. Cl.[2] C02B *1/36*
U.S. Cl. 210—62 2 Claims



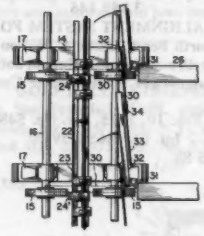
1. An improved method for the introduction of chlorine into solids contact clarifiers for treating raw waters of the type which comprises a clarifier basin having walls, a means for the introduction of influent near the center of the basin, a means for stirring influent, a solids contact zone, a means for depositing sludge removed from the influent on the bottom of the basin, and a means for removing clarified water over the top of said walls said improvement comprising: the addition of chlorine to the water contained within the clarifier basin through orifices located below the surface of the water and at or near the top level of the water in the clarifier being substantially above the solids contact zone whereby chlorine is not present in the solids contact zone and chlorine is present at and slightly below the surface of the water, said method further characterized as maintaining a residual chlorine content of from 0.1–1.0 ppm in the effluent water from said clarifier, and maintaining sufficient chlorine at the top and near the walls of said clarifier so as to prevent septic conditions from forming.

3,989,144

APPARATUS FOR TRANSFERRING A MOLD

Kenzo Momota, Kawasaki; Koji Nunokawa, Tokyo, and Yoshihiro Toyoda, Shimodate, all of Japan, assignors to Nippon Concrete Industries Co. Ltd., Tokyo, Japan

Filed Nov. 14, 1974, Ser. No. 523,880
Int. Cl.[2] B28B *21/30;* B65G *35/00*
U.S. Cl. 214—1 PB 6 Claims



1. In the combination of a transfer apparatus and a centrifugal compacting device having a plurality of pairs of adjacent rollers positioned at intervals along a pair of shafts for driving a corresponding plurality of rings on a mold, said transfer apparatus comprises:

a plurality of transfer rails leading from one roller of said pair of rollers;

a plurality of lift means positioned between the rollers of a pair of rollers for engaging said rings and raising said rings above said rollers by vertical movement of said lift means; and

a plurality of arm means movably mounted to a corresponding transfer rail for traversing the distance between said lift means and said transfer rail in an extended position and for engaging said rings and transferring said mold from said lift means to said transfer rail;

means connected to each arm means for simultaneously moving said arm means from contracted position to an extended position after said lift means has raised said rings above said pair of rollers.

3,989,145

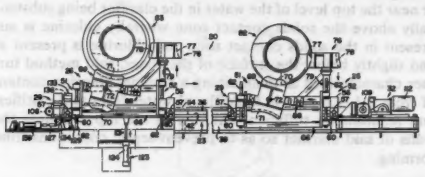
CORE TRANSFER APPARATUS

Dolar Harshadrai Vaishnav, Cuyahoga Falls, Ohio, assignor to The Firestone Tire & Rubber Company, Arkron, Ohio

Filed Jan. 20, 1975, Ser. No. 542,318
Int. Cl.[2] B25J *3/00*
U.S. Cl. 214—1 R 8 Claims

7. A transfer carriage for a core transfer apparatus having first and second end portions and comprising a frame having rollers for travel in a guideway, said frame having a plurality of vertically extending guide rods, a saddle member carried by

said frame and adapted to move between first and second vertical positions relative thereto in movement guided by said guide rods, first and second supporting pad members carried by said saddle member and each pad member having a core engaging surface and a tread ring engaging surface, said first pad member being pivotally connected to said saddle member



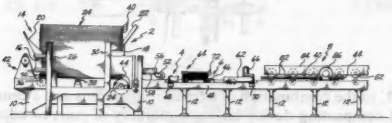
for pivotal movement about a horizontal axis between first and second positions, said second pad member being pivotally connected to said saddle member for pivotal movement about a vertical axis between first and second positions, and latch means for securing said first and second pad members respectively in said first and second positions.

3,989,146

FEED AND ALIGNMENT SYSTEM FOR PANELS

Wilson J. Lee, North Bend; Clotis A. Wilson, Sr., Coos Bay; Vincent E. Howell, and E. James Bunno, both of North Bend, all of Oreg., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Feb. 10, 1975, Ser. No. 548,490
Int. Cl.² B65G *59/00*
U.S. Cl. 214—8.5 SS **7 Claims**



1. A feed and alignment system of the type adapted to feed a plurality of substantially flat panels from a feed station in a longitudinal direction for passage through a downstream edge aligning mechanism, comprising:

support means for holding a stack of panels at the feed station,

an injector mechanism adapted to engage and motivate a predetermined number of panels from the bottom of the stack in the longitudinal direction and including:

at least one vertically adjustable injector shoe positioned adjacent the bottom upstream edge of the panel stack and having a retracted position that is upstream from the lateral edge of the stack and an extended position that is a predetermined distance downstream from the edge of the stack, and

means to actuate the injector shoe whereby the shoe will engage the predetermined number of panels at their upstream lateral edges causing them to move in the longitudinal direction toward the downstream edge aligning mechanism,

conveying means to engage and convey the predetermined number of injected panels as they are traveling in the longitudinal direction whereby the panels are conveyed from the feed station into the downstream aligning station, and

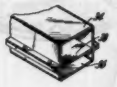
edge aligning means adapted to cause at least one longitudinal edge of each of the predetermined number of panels to become positioned substantially adjacent to a fixed reference plane.

3,989,147

BULK CEMENT STORAGE SYSTEM

Morton Fried, 705 Bolton Road, Far Rockaway, N.Y. 11691

Filed Jan. 30, 1975, Ser. No. 545,297
Int. Cl.² B65G *67/58, 53/40*
U.S. Cl. 214—14 **12 Claims**



1. A bulk cement storage system comprising:

a circular base member for supporting a free standing cement pile and having an outer edge, a centrally located opening, and sloping from said outer edge to said central opening;

a plurality of porous sections formed in said base member and extending radially toward said central opening;

a generally circular shaped dome coaxial with said base member, having its largest dimension positioned on said base member, and covering it to form a storage area, the maximum height of said dome being at least one half the diameter of said base member;

means for providing a stream of compressed air through said sections into said storage area;

input means coupled to the upper portion of said dome for feeding cement into said storage area, and

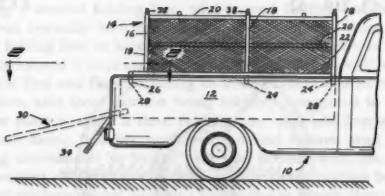
output means coupled to said central opening including a pneumatic conveying system for removing said cement from said storage area.

3,989,148

SIDE PANELS AND LOADING RAMP FOR PICKUP TRUCK

John R. Donohue, P.O. Box 94, Couderay, Wis. 54828

Filed Sept. 19, 1975, Ser. No. 615,110
Int. Cl.² B65G *67/02*
U.S. Cl. 214—85 **7 Claims**



1. In combination with a truck having a truck bed and provided with at least one upwardly opening panel support pocket at a side of said bed; side panel and loading ramp structure, said structure including;

A. at least two panel assemblies;

B. means for temporarily connecting said panel assemblies in fixed relation to each other to lie in substantially the same plane, said panels so connected forming a loading ramp;

C. means for mounting a forward portion of said loading ramp at a rear portion of a truck and on a bed thereof, and for preventing longitudinal movement of said ramp away from said truck and said truck bed;

D. means for mounting said panel assemblies along at least one side of said truck in at least one upwardly opening panel support pocket provided in the truck to temporarily fixedly position said assemblies along said side and substantially normal to an upper surface of said bed.

3,989,149

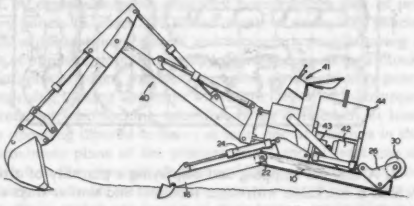
EXCAVATING DEVICE

Neil L. Smith, and Harold Lambert, both of Sudbury, Canada, assignors to Auburn Equipment Limited, Sudbury, Canada

Continuation-in-part of Ser. No. 450,545, March 13, 1974, abandoned. This application Nov. 4, 1974, Ser. No. 520,962

Int. Cl.² E02F *3/32*

U.S. Cl. 214—138 R **7 Claims**



1. A platform for mounting a hydraulic implement for in plant use comprising a rigid portion; said rigid portion comprising a first rigid member defining a side of said rigid portion, a second rigid member substantially parallel to said first member defining an opposite side of said rigid portion and third and fourth members defining respectively ends of said rigid portion, all of said members being parallel to single plane; means for readily removably mounting a hydraulic implement comprising a hydraulic boom and operator console on said rigid portion whereby said implement may be readily removed from said platform and said platform and said implement may then be transported to within a confined area and readily reassembled therein, and a pair of ground engaging members independently affixed to one of said ends for independent pivotal movement about an axis parallel to said plane, each of said ground engaging members being pivotable from a first position wherein the angle between said plane and said ground engaging member is about 90°, through an arc of rotation greater than 90°, the lower surfaces of said ground engaging members and said rigid portion forming a substantially flat ground engaging plane when said ground engaging members are parallel to said plane of said rigid portion.

3,989,150

PIPE CARRYING ATTACHMENT FOR CONSTRUCTION EQUIPMENT

James M. Stephenson, 3228 Lichen Drive, Bartlett, Tenn. 38134, and Philip J. Wire, 4134 Auxarms Drive, Apt. 2, Memphis, Tenn. 38128

Filed Jan. 10, 1975, Ser. No. 540,115

Int. Cl.² B66C *3/04*

U.S. Cl. 214—147 G **9 Claims**

1. An attachment for construction equipment having means to raise and lower said attachment and to position said attachment at a predetermined and preselected site, said attachment comprising:

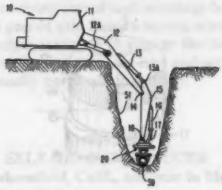
a mounting plate and means for connecting said mounting plate to said construction equipment, said means for connecting said mounting plate to said turntable including a thrust-roller bearing;

a turntable depending from said mounting plate;

means mounting said turntable for rotation with respect to said plate;

first actuator means for effecting angular displacement of said turntable with respect to said plate;

a beam pivotally connected to and depending from said turntable;



second actuator means connected to said beam for effecting predetermined movement of said beam in a plane substantially perpendicular to said turntable;

pipe clamp means depending from said beam, said pipe means comprising at least a pair of jaw members; and,

means to effect separation of said jaws one from the other.

3,989,151

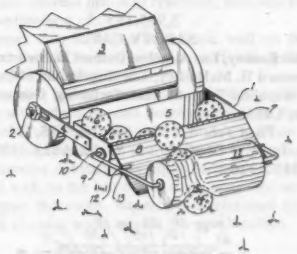
GOLF BALL RETRIEVER

Curtis P. Dyer, San Francisco, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed May 2, 1975, Ser. No. 573,877

Int. Cl.² B60P *1/00*

U.S. Cl. 214—353 **1 Claim**

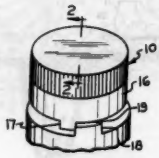


1. A detachable golf cart ball retreiver comprised of a compliant resilient cylindrical brush, the axis of said brush pivotably connected by the end thereof to a ball storage compartment by a pivot arm, a ramp, said ramp hingably fastened to said compartment having an edge in angular relationship articulated by fingers transverse to the length of said pivot arm capturing said ramp edge, said fingers intermediate said brush and the end of said pivot arm pivotably connected to said storage compartment, said brush rotatable about said axis as the cart is propelled, said brush being rotated from the contact of the periphery of said brush with the terrain therebelow, said fingers forming a slot for slidably engaging said ramp edge to said pivot arm intermediate the ends of said pivot arm, said ramp having a variable inclination to the earth automatically varied by said pivot arm in response to the movement of said brush about undulations in the surface of said terrain.

3,989,152
CHILD-RESISTANT LOCKING MEANS FOR A TWIST-ACTION CONTAINER CAP

Randall K. Julian, Elberfeld, Ind., assignor to Sunbeam Plastics Corporation, Evansville, Ind.

Filed Feb. 9, 1976, Ser. No. 656,322
Int. Cl.² B65D 55/02, 85/56; A61J 1/00
U.S. Cl. 215—216 10 Claims



1. Child-resistant locking means for a container having a tubular neck with a neck finish for a twist-action cap, said means consisting of,

a. an abutment on said container, said abutment being spaced radially outwardly from the outer side of said neck and having

1. a face lying substantially in a radial plane of said neck and

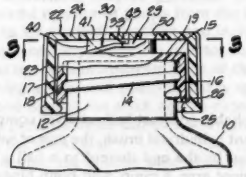
2. an inner side extending from the inner edge of said face in a retrograde direction and angled outwardly therefrom, and

b. a deflectable tab on said cap, said tab having a portion that normally extends radially outwardly into a position of engagement with said face of said abutment and that is movable inwardly relative to said face by engagement with said inner side of said abutment when said cap is twisted onto said container neck to closed position and by manual inward deflection prior to retrograde rotation of said cap from closed position.

3,989,153
SAFETY CAP

John W. McRoskey, Los Angeles; Delbert D. Swartz, Torrance, and Leonard H. McRoskey, Los Angeles, all of Calif., assignors to Republic Tool & Manufacturing Corporation, Los Angeles, Calif.

Filed Feb. 6, 1976, Ser. No. 655,714
Int. Cl.² B65D 55/02, 85/56; A61J 1/00
U.S. Cl. 215—220 9 Claims



1. In a safety cap of the character described, the combination of:

a. a cap member adapted to be screwed onto a container;

b. a driver member rotatably supported by said cap;

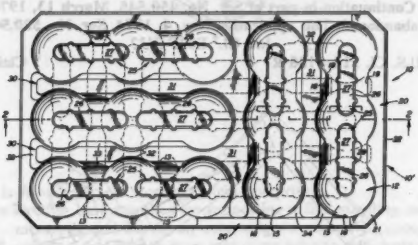
c. means cooperating between said cap member and said driver member, including driver means on said driver member and driven means on said cap member, said driver and driven means co-engaging when said driver member is rotated in a direction to screw said cap on said container; and

d. said driver means or said driven means releasing to give a signal when said cap member is tightly screwed on said bottle.

3,989,154
STACKABLE AND NESTABLE TRAY FOR SHIPPING AND DISPLAYING ARTICLES

Mercer Donald Walklet, Belleair Beach, Fla., assignor to McNeil Corporation, Akron, Ohio

Continuation of Ser. No. 395,348, Sept. 7, 1973, abandoned. This application Nov. 4, 1975, Ser. No. 628,744
Int. Cl.² B65D 21/04, 1/34
U.S. Cl. 217—26.5 11 Claims

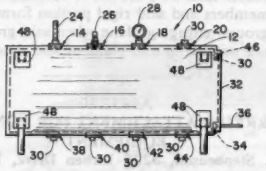


1. A tray for shipping and displaying a plurality of articles which is stackable with other identical and similar trays comprising, a plurality of pocket means adapted to receive the articles, opposed spacer walls joining each of said plurality of pocket means to at least one other of said pocket means, lower support means extending from the bottom of said pocket means and communicating with at least two of said pocket means, lower bearing surface means on said lower support means, upper support means extending above and disposed between certain of said pocket means, and upper bearing surface means on said upper support means adapted to engage a portion of each lower bearing surface means of other identical and similar trays to effect stacking.

3,989,155
INVERTABLE FUEL TANK

Richard H. Conklin, Greenwich, Conn., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Feb. 6, 1976, Ser. No. 655,677
Int. Cl.² B65D 25/24, 7/40
U.S. Cl. 220—1 B 1 Claim



1. An invertable fuel tank comprising: a tank body having top and bottom portions; a first group of threaded apertures through the wall of said tank on said top portion for operatively receiving a filler pipe, vent and guage, said first group of apertures being arranged in a predetermined pattern; a second group of threaded apertures through the wall of said tank on said bottom portion also being arranged in said predetermined pattern, one aperture of said second group being located for receiving an outlet pipe; removable plug means for unused apertures of said first and second groups; a plurality of legs; and first and second groups of sockets respectively car-

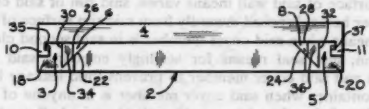
ried by said top and bottom sides for removably receiving said legs whereby said tank may be utilized in either an upright or inverted orientation.

3,989,156

PALLET CONTAINER

William J. Lowry, 7208 Ridgeland, Sylvania, Ohio 43560

Filed Aug. 29, 1974, Ser. No. 501,621
Int. Cl.² B65D 7/00, 9/12, 9/34
U.S. Cl. 220—4 F 14 Claims



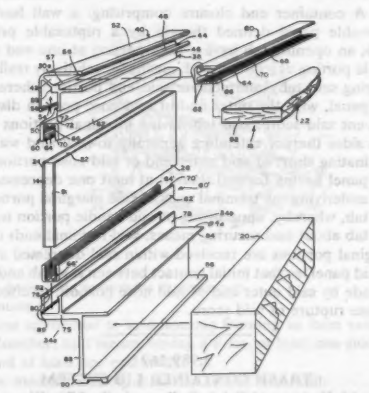
1. A composite pallet container comprising a pair of primary panels to which are joined a pair of secondary panels, each of said primary panels and secondary panels having a pair of opposing complimentary locking means on their outermost vertical edges; the locking means on the primary panel comprising locking apertures which are largest at their upper extremities, said locking apertures being defined by at least two opposing tapered surfaces at least one of which is in the approximate plane of the primary panel and at least one of which is in the approximate plane of the secondary panel; the locking means on the secondary panel comprising a pair of projections which are largest at their upper extremities said projections having opposing tapered surfaces at least one of which is in the approximate plane of the primary panel and at least one of which is in the approximate plane of the secondary panel.

3,989,157

CONTAINER ASSEMBLY

James Veenema, Centerport, N.Y., assignor to Lunn Laminates, Inc., Wyandanch, N.Y.

Filed May 29, 1974, Ser. No. 474,258
Int. Cl.² B65D 7/32, 9/34, 7/44
U.S. Cl. 220—4 F 10 Claims



1. An assembly for a container, comprising:

a first and second rectangular panel;

a U-shaped channel molding secured to each of two opposite edges of each panel, each of said moldings having spaced parallel side walls joined by an integral end wall, the inner sides of said side walls being formed with a plurality of teeth to bite into and securely engage opposite sides of one of said panels at each of said opposite edges; and

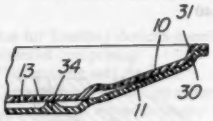
a rail for engaging one of said edges from each of said first and second panels and holding said first and second panels in a mutual perpendicular array, said rails having two pairs of spaced flanges disposed in mutually perpendicular disposition, each pair of said spaced flanges defining a recess, one of said recesses for receiving one of said moldings from said first panel and the other of said recesses for receiving one of said moldings from said second panel, each pair of said flanges having inwardly extending opposing ledges arranged to engage the free edges of the received moldings so that said first and second panels are held in mutually perpendicular array.

3,989,158

SELF-DRAINING SAUCER

John Florian, Bakersfield, Calif., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 3, 1974, Ser. No. 529,156
Disclosure was also published under second Trial Voluntary Protest Program on Jan. 13, 1976
Int. Cl.² A47G 19/00
U.S. Cl. 220—23.83 3 Claims



1. A self-draining saucer or the like composed of two discs of like upwardly concave shape I of substantially equal diameter and coacting to form a unitary structure having an internal reservoir to receive liquid and means to drain liquid from the upper surface thereof into said reservoir, said saucer comprising the combination of:

a. an upper disc having a concentric wall on the bottom surface thereof and at least one perforation through the bottom of said disc; and

b. a lower disc having a circular concentric well defined by a bottom surface spaced downwardly from the concave surface of said lower disc and a circular wall on the upper face of said lower disc, said circular wall having an internal diameter substantially equal to the external diameter of said wall on the bottom of said upper disc and adapted to engage therewith, whereby the frictional engagement of said circular walls retains the combination.

3,989,159

DRAWN AND IRONED STEEL CONTAINER WITH INCLUSIONS AND SPHEROIDAL CARBIDES

Wayne Robert Nixon, Arlington Heights; Edward Willard Hitchler, Elgin, and Edward Frank Kubacki, Arlington Heights, all of Ill., assignors to American Can Company, Greenwich, Conn.

Filed Feb. 4, 1972, Ser. No. 223,678
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976
Int. Cl.² B65D 7/42
U.S. Cl. 220—66 9 Claims

1. A thin walled drawn and ironed container body produced from a steel blank having a thickness in the range between 0.01 and 0.013 inches, said container body including integral side and bottom walls, said side wall having a thickness in the range between 0.003 and 0.0045 inches after the drawing and ironing process, said bottom wall having a thickness in the range between 0.01 and 0.013 inches after the drawing and

ironing process, the steel of said blank and said resulting container body having inclusions of 0.0003 inches maximum

and spheroidal carbides of 0.0002 inches maximum whereby said side wall is formed without defects therein.

3,989,160

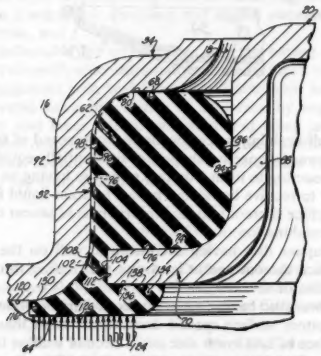
CONTAINER COVER SEAL

Bert W. Manning, Bay Village, and James F. Norton, Berea, both of Ohio, assignors to The Hansen Manufacturing Co., Cleveland, Ohio

Filed Jan. 14, 1976, Ser. No. 649,030

Int. Cl.² B65D *53/00*

U.S. Cl. 220—240 **9 Claims**



1. An assembly comprising a container body for holding fluid under pressure, said container including wall means defining a non-circular arcuate opening in said container, said wall means including an axially extending arcuate side surface circumscribing a first area and a non-circular arcuate outer rim surface extending transversely to and inwardly from said side surface and circumscribing a second area which is less than said first area, cover means for blocking said non-circular arcuate opening in said container, said cover means including a non-circular arcuate cover member having a configuration similar to the configuration of said opening and being insertable through said opening to move said cover member between an open position spaced apart from said container and anyone of a plurality of closed positions in which said cover member is circumscribed by said side surface of said wall means, said cover member including a main body portion, a non-circular arcuate side wall circumscribing said main body portion and extending inwardly from said main body portion toward the interior of said container when said cover member is in anyone of said closed positions, and a non-circular arcuate rim circumscribing said side wall of said cover member and extending transversely outwardly from an inner portion of said side wall of said cover member, said rim of said cover member having an outer peripheral surface of a non-circular arcuate configuration similar to the non-circular arcuate configuration of said side surface of said wall means and circumscribing a third area which is less than said first area and greater than said second area, said cover member in a first one of said closed positions being disposed with said arcuate side wall of said cover member being parallel to and circumscribed by said side surface of said wall means and with said rim of said cover member disposed inwardly from said rim surface of said wall means, said cover member in a second one of said closed positions being disposed with said arcuate side wall of said cover member in a skewed relationship with and circumscribed by said side surface of said wall means so that the spacing between said side wall of said cover member and said side surface of said wall means varies, said rim of said cover member being disposed inwardly from said rim surface of said wall means when said cover member is in said second closed position, and seal means for sealingly engaging said wall means and said cover member to prevent fluid leakage from said container when said cover member is in anyone of said plurality of closed positions, said seal means including a body portion and an outwardly projecting lip portion, said body portion of said seal means being disposed between said side wall of said cover member and said side surface of said wall means and between said rim of said cover member and said rim surface of said wall means when said cover member is in anyone of said plurality of closed positions, said lip portion of said seal means being disposed between and in engagement with said wall means and said outer peripheral surface of said rim of said cover member when said cover member is in anyone of said plurality of closed positions.

3,989,161

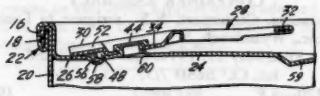
CONTAINER END CLOSURE

Burton Frank Pillnik, Cary, Ill., assignor to American Can Company, Greenwich, Conn.

Filed Mar. 3, 1976, Ser. No. 663,351

Int. Cl.² B65D *41/32*

U.S. Cl. 220—273 **9 Claims**



1. A container end closure comprising: a wall having a removable panel defined therein by a rupturable primary score; an opening tab have a nose portion at one end and a handle portion at its other end; means for relatively resiliently securing said tab, intermediate said end portions thereof, to said panel, with the outer end of said nose portion disposed adjacent said score, said tab having marginal portions along both sides thereof extending generally toward said wall and terminating short of said outer end of said nose portion, and said panel having formed therein at least one depressed section underlying the terminal ends of said marginal portions of said tab, whereby, upon lifting of said handle portion to pivot said tab about said securing means, said terminal ends of said marginal portions are received within said depressed section of said panel, so that initial contact between said tab and panel is made by said outer end of said nose portion, to effectively initiate rupture of said score.

3,989,162

TRASH CONTAINER LID SYSTEM

Allan M. Hodge, and Calvin P. Owen, both of San Diego, Calif., assignors to Calvin P. Owen, San Diego, Calif.

Continuation of Ser. No. 494,622, Aug. 5, 1974, abandoned. This application Dec. 24, 1975, Ser. No. 644,188

Int. Cl.² B65D *43/24*

U.S. Cl. 220—331 **3 Claims**

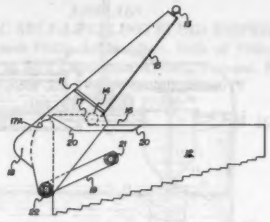
1. A trash container lid system for use with large industrial trash bins in which the lid is rotatably coupled to the trash bin

by means of a lever arm and is slidably coupled to the trash bin by means of a roller on the lid, comprising:

a trash bin having an upper edge;

a lid section having a lower edge dimensioned for cooperation with said trash bin upper edge;

first and second lever arms, said first and second lever arms each being rotatably coupled at one end to first and second pivot points, respectively, adjacent to opposite edges of said trash bin and rotatably coupled at their other end to third and fourth pivot points adjacent to corresponding edges of said lid section;



first and second rollers rotatably carried by said lid section adjacent to said corresponding edges;

first and second roller tracks on the top of said opposite edges of said trash bin, said first and second roller tracks rotatably carrying said first and second rollers; and

a raised portion at the back termination of said first and second roller tracks, to stop the rearward movement of said lid section when it is raised rearwardly for the purpose of opening said bin to receive trash; whereby said lid can remain in a stabilized partially open position.

3,989,163

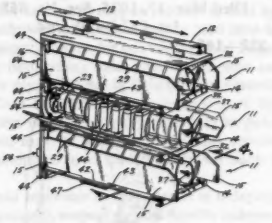
VENDING APPARATUS WITH HELICAL DISCHARGE MEMBER

Francis A. Wittern, Des Moines, Iowa, assignor to Fawn Engineering Co., Des Moines, Iowa

Filed Apr. 28, 1975, Ser. No. 572,061

Int. Cl.² G07F *11/36*

U.S. Cl. 221—75 **47 Claims**



16. A vending apparatus comprising:

a housing;

means connected to said housing forming an item vending chamber, said means having a floor, at least one sidewall and at least one end wall;

plate means rotatably mounted to said end wall;

a substantially helical member disposed within said chamber and having a helical portion of one end thereof connected to said plate means; and

means mounted within the housing for rotating said plate means and thereby said helical member, said means for rotating said plate means including teeth on said plate and a drive gear meshing with said teeth, said plate means being generally annular, said teeth being disposed about the inner periphery thereof and said drive gear being disposed within said inner periphery.

3,989,164

MAGNETIC HANDLING EQUIPMENT

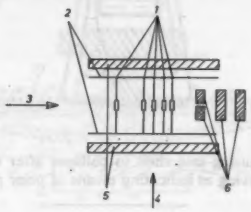
Georg Hager, Denzlingen, Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed May 29, 1975, Ser. No. 582,018

Claims priority, application Germany, June 8, 1974, 2427755

Int. Cl.² B23Q *7/16*

U.S. Cl. 221—212 **10 Claims**



1. An apparatus for handling devices consisting in part of a ferromagnetic material comprising:

sliding means for guiding said devices;

a first magnet arrangement producing a first steady inhomogeneous magnetic field whose intensity has a maximum value along the sliding means in the transporting direction and whose lines of force penetrate said sliding means generally vertically in relation to a surface of said sliding means, wherein the magnetic field of said first magnet arrangement first increases in the transporting direction of the devices and then decreases after having passed a maximum value at the end of said sliding means so that the devices will collect at one end of said sliding means;

a switch; and

at least one geometrically firmly arranged transporting electromagnet controlled by said switch and producing a second inhomogeneous magnetic field which overlaps said first magnetic field of said first magnet arrangement, said electromagnet capable of being switched in relation to time in such a way that said devices, when correspondingly dimensioning the magnet field and subsequent to their insertion on said sliding means, can be geometrically affected by said transporting electromagnet and wherein by weakening said second inhomogeneous magnetic field below a value necessary for pulling off additional devices, at least one device can be pulled off said end of said sliding means.

3,989,165

COMPARTMENT BAG FOR AEROSOL CONTAINER

Fred B. Shaw, Hinsdale, and Clyde F. DuPuis, Downers Grove, both of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

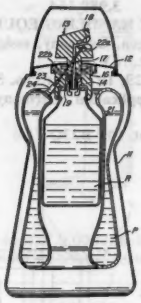
Continuation-in-part of Ser. No. 335,192, Feb. 23, 1973, abandoned, which is a continuation of Ser. No. 135,964, April 21, 1971, abandoned. This application Nov. 14, 1974, Ser. No. 523,638

Int. Cl.² B67D *5/54*

U.S. Cl. 222—23 **10 Claims**

1. An aerosol container comprising a collapsible outer shell, a flexible product containing bag therein, means for dispensing the product operatively connected to the bag, means for exhausting the product from the bag through said dispensing means, said shell defining a gas filled chamber encompassing said product bag, means hermetically sealing said container

with said bag therein whereby upon said product being withdrawn from said bag subatmospheric pressure develops in said



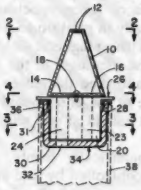
chamber causing said shell to collapse after each discharge whereby serving as indicating means of prior product use.

3,989,166

APPARATUS FOR METERING AND DISPENSING

George Saunders, Chicago, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Aug. 4, 1975, Ser. No. 601,806
Int. Cl.² B67D 5/22
U.S. Cl. 222—48 3 Claims



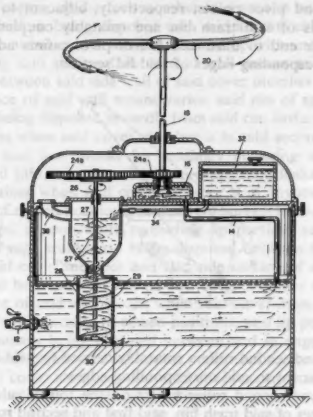
1. Apparatus for metering and dispensing which comprises head means for storing and dispensing a measured quantity of a granular food seasoning material, perforate openings in the top of said head of a diameter slightly larger than the diameter of the grains of the granular material to be dispensed, base means in said head, cylinder means rotatably mounted on said base of said head and having a plurality of chamber means each of a different volume with influent means and effluent means therein for receiving and discharging therefrom a measured quantity of granular food seasoning material, said effluent means of said chamber means rotatably registerable with influent means in said head, closure means for rotatably receiving said cylinder and for enclosing the walls and base of said cylinder, influent means in the base of said closure rotatably registerable with said influent of said chamber means, said base of said head being positionable to close the effluent of one of said chamber means when the influent of said one chamber means so closed is registered with the influent of said closure, the base of said cylinder being positionable with respect to said closure means to close the influent means of one of said chamber means when the effluent means of said chamber is registered with the influent of said head, first indicia means on said head, second indicia means on said cylinder for each of said chamber means and third indicia means on said closure, said first, second and third indicia means being alignable with one another for selecting and charging one of said chamber means and discharging said chamber means into said head.

3,989,167

LIQUID-SOLID DISPENSER

See Fong Chan, 47-09 Newtown Road, Astoria, N.Y. 11103

Filed Nov. 26, 1975, Ser. No. 635,388
Int. Cl.² B67D 5/56
U.S. Cl. 222—145 6 Claims



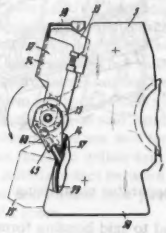
1. A solid-liquid mixing and dispensing device comprising a main flow line, a rotatable flow-through shaft in rotatably driven connection and in communication with said flow line, a solid material container, a conduit in communication with said container and flow line, means driven by said rotatable shaft for causing flow of solid material from the container into said main flow line and a device mounted on said rotatable shaft adapted to be driven in rotation on liquid flow therethrough.

3,989,168

APPARATUS FOR REPLENISHING TONER IN THE DEVELOPMENT SYSTEM OF A COPYING MACHINE

Werner Salger, Hamburg-Langenhorn, Germany, assignor to Lumoprint Zindler KG, Hamburg, Germany

Filed Mar. 17, 1975, Ser. No. 558,681
Int. Cl.² B67D 5/64
U.S. Cl. 222—165 9 Claims



1. In a copying machine having a development system wherein a toner can be applied to a surface having a chargeable area, container means in said development system for containing a supply of toner for the chargeable area a duct having a first end and a second end with the first end leading into said container means, a rotary slide valve mounted on said container means, the second end of said duct located at said valve, mounting positioned on said valve and arranged to receive the opening from a toner supply container, said valve

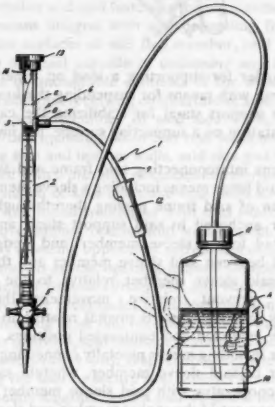
having a rotatable first part and a second part with said second part fixed to said container means and to the second end of said duct, said mounting attached to said first part and rotatable therewith between an upper and a lower position, connector means on the rotatable first part of the valve, said connector means arranged for establishing communication through the second end of said duct in the upper position of the mounting and for sealing the second end of said duct in the lower position of the mounting for closing the second end of said duct.

3,989,169

AUTOMATIC SELF-LEVELING FLUID DISPENSER

John J. Bigley, and Philip J. Gaughan, both of Philadelphia, Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed June 13, 1975, Ser. No. 586,679
Int. Cl.² B65D *37/00*
U.S. Cl. 222—207 **19 Claims**



1. An automatic zeroing burette assembly comprising:
a burette column having an upper zero level and aperture means in a side wall of said column at said zero level,
fluid reservoir supply means for containing fluid in use, and
conduit means connecting said aperture means and said fluid reservoir supply means in fluid flow communication,
wherein said fluid reservoir supply means is of the type wherein positive and negative pressure may be generated, such that fluid may be delivered into said column to a level above said zero level and then drawn back to said zero level,
wherein said fluid reservoir supply means is independently moveable in use with respect to said burette column, and
wherein said conduit means extends externally between said fluid reservoir supply means and said burette column.

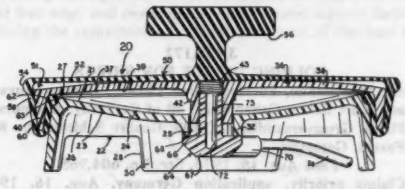
3,989,170

SELF-PRESSURIZED PORTABLE CONTAINER FOR LIQUIDS

John S. Viehe, Somerville, N.J., assignor to World Products Merchandising Corporation, Ramsey, N.J.

Continuation-in-part of Ser. No. 553,095, Feb. 26, 1975, Pat. No. 3,929,362. This application June 30, 1975, Ser. No. 591,521
Int. Cl.² B65D *37/00*
U.S. Cl. 222—212 **10 Claims**

1. A self-pressurized portable container for liquid, comprising:
a bottom sealing ring plate having:
a first upper circular top wall formed with a central hole,
an axially depending cylindrical flange surrounding said central hole, and
a depending circumferential first side wall integral with the periphery of said top wall;
a pressure plate having:
a second upper circular top wall,
a depending circumferential second side wall integral with the periphery of said second top wall and nesting on the bottom ring plate, and
an axially depending nipple axially aligned with said cylindrical flange, and having an axial bore;
a circular elastic membrane having:



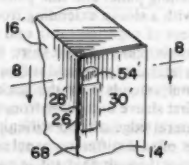
a third circular top wall overlaying said pressure plate and defining therewith an expansible chamber for containing liquid under pressure, said bore communicating with said chamber,
an axially extending depending skirt integral with the periphery of said third top wall surrounding and abutting said second side wall, and
an inwardly turned circumferential wall section concentric with and integral with said skirt engaged between said first and second side walls; and
attachment means engaging said nipple and flange and detachably securing said sealing ring plate and pressure plate together to hold said inwardly turned wall section of said membrane in sealing pressure engagement while said top wall of the membrane is free to expand under pressure of liquid filling said chamber.

3,989,171

CARTON WITH POUR SPOUT

Edwin L. Arneson, Hillsdale, N.J., assignor to Federal Paper Board Company, Inc., Montvale, N.J.

Filed Sept. 29, 1975, Ser. No. 617,516
Int. Cl.² B65D *83/06*
U.S. Cl. 222—541 **10 Claims**



1. A carton structure formed of paperboard or similar foldable sheet material which includes a pouring spout arrangement comprising a spout forming insert of like material disposed in the closed position on the inside face of a carton side wall forming panel, which insert includes an outer wall forming panel having an integral pull tab formation extending from the top end forming portion thereof and at least one side wall forming panel, and said carton side wall forming panel having at least one tear line extending upwardly near the top of the carton and disposed inwardly of a side edge and a transverse slit extending at the top end of said tear line, said tear line extending along one side of a carton side wall area which is of

an extent corresponding approximately to the area of said outer wall forming panel of said spout forming insert, and said insert being positioned on the inside face of said carton wall with said wall panel lying flat against the inside face of said carton side wall panel and with said pull tab extending through said transverse slit in the carton side wall panel, and said outer wall forming panel of said insert being secured in overlying engagement with the carton side wall area which corresponds to the area of the outer wall forming panel of said spout forming insert, whereby, when said pull tab is pulled outwardly in a direction normal to the carton side wall, the side wall panel of said insert will fold so as to move into the opening resulting from the tearing of said carton side wall area on said tear line and the outward movement of said carton side wall area.

3,989,172

FOLDING DEVICE FOR SHIRTS

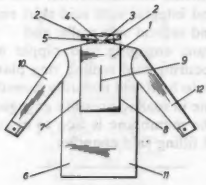
Heinz Wiedemann, Fuerth; Alfred Pielach, Herzogenaurach, and Kurt Behre, Osnabrueck, all of Germany, assignors to Firma Grossversandhaus Quelle Gustav Schickedanz KG, Fuerth, Germany

Filed Aug. 15, 1975, Ser. No. 604,965

Claims priority, application Germany, Aug. 16, 1974, 7427718[U]

Int. Cl.² A41H *5/00*

U.S. Cl. 223—71 **4 Claims**



1. A method for folding a shirt on a stiffening panel having a slit, said shirt having a main panel substantially equal to the width of said stiffening panel and side panels on either side of said main panel with a sleeve extending from each side panel, comprising the steps of superimposing said stiffening panel on the back of the main panel of said shirt, folding one of said side panels over a lateral edge of said stiffening panel such that said one side panel extends over the back of said stiffening panel, folding a first sleeve extending from said one side panel over the other lateral edge of said stiffening panel to extend between the front of said stiffening panel and said shirt, passing said first sleeve through said slit in said stiffening panel from front to back such that the cuff of the said first sleeve is disposed on the back of said stiffening panel, folding the other of said side panels over the other lateral edge of said side panel, folding the second shirt sleeve of said other side panel in a substantially V-shaped configuration on the back of said stiffening panel, folding the cuff of said second sleeve about said other lateral edge to extend the cuff thereof to the front of the shirt, folding the shirt about the lower edge of said stiffening panel to extend over the back of said stiffening panel, and tucking the lower edge portion of the shirt in between said stiffening panel and said folded over sleeves, whereby said slit in said stiffening panel clampingly fastens said shirt to said stiffening panel.

3,989,173

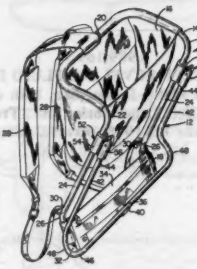
HINGED LEG STAND FOR CHILD CARRIER

Albert W. Gebhard, Boulder, Colo., assignor to Gerico, Inc., Boulder, Colo.

Filed Apr. 2, 1973, Ser. No. 347,195

Int. Cl.² A47D *13/02*

U.S. Cl. 224—6 **13 Claims**



1. In a carrier for supporting a load on a person's back having a frame with means for suspending the load from the frame and a support stand for stabilizing the carrier in an upright orientation on a supporting surface, the improvement comprising:

hinge means interconnecting said frame and said support stand, said hinge means including a sleeve member having a portion of said frame passing therethrough, a socket member anchored to said support stand and pivotally connected to the sleeve member, and wedging means inserted between said sleeve member and the frame to wedge said sleeve member relative to the frame and thereby prevent relative movement therebetween whereby said leg stand is pivotal relative to said frame between extended and contracted positions, said sleeve member including means pivotally connecting said socket member to said sleeve member, wherein said wedging means cooperates with said sleeve member to prevent disengagement of the socket member and sleeve member at the pivotal connection.

3,989,174

CONVERTIBLE SADDLE BRIEF CASE

Sidney Norinsky, 110 W. 96th St., New York, N.Y. 10025

Filed Feb. 6, 1975, Ser. No. 547,655

Int. Cl.² B62J *9/00*

U.S. Cl. 224—31 **1 Claim**

1. A convertible receptacle capable of being used with wheeled vehicles having a support member, comprising, in combination: a first housing portion operationally defining a

first receiving compartment therewithin; a second housing portion operationally defining a second receiving compartment therewithin; a web portion integral with and interconnecting said first and second housing portions; a first handle portion associated with and secured to said first housing portion; a second handle portion associated with and secured to said second housing portion; and snap means integral with said housing portions for removably holding said first and second housing portions in a proximate relationship with respect to one another; said first housing portion including front and rear walls interconnected by opposing side and bottom walls, said side and bottom walls being formed with a plurality of collapsible portions thereof to permit expansion of said front and rear walls away from one another, a flap member integral with said rear wall extending in overlapping relationship with respect to said front wall, thereby covering uppermost extremities of said front and side walls and an access opening defined thereby, a fastener member integral with said front wall and accessible to a user of the convertible receptacle, a fastener portion of said flap member extending to said fastener member, said fastener portion including fastening means cooperative with respect to said fastener member for enabling the user to secure said fastener member and said fastening means together, and a pair of guard means integral with and depending from opposite inside border surfaces of said flap member, said guard means comprising material capable of collapsing and expanding to cover paths of undesirable elements of the weather to inner portions of said first receiving compartment, said guard means covering upper extremities of said side walls, said second housing portion including front and rear walls interconnected by opposing side and bottom walls, said side and bottom walls being formed with a plurality of collapsible portions thereof to permit expansion of said front and rear walls away from one another, a flap member integral with said rear wall and extending in overlapping relationship with respect to said front wall, thereby covering uppermost extremities of said front and side walls and an access opening defined thereby, a fastener member integral with said front wall and accessible to a user of the convertible receptacle, a fastener portion of said flap member extending from said rear all over said flap member to said fastener member, said fastener portion including a fastening means cooperative with respect to said fastener member for enabling the user to secure said fastener member and said fastening means together, and a pair of guard means integral with and depending from opposite inside border surfaces of said flap member, said guard means comprising materials capable of collapsing and expanding to cover paths of undesirable elements of the weather to inner portions of said first receiving compartment, said guard means covering upper extremities of said side walls, said web portion being formed with handle openings therethrough adjacent said first and second housing portion rear walls, said first and second handle portions extending through said handle openings and being capable of movement between usable and retracted positions, said first and second handle means being shaped to permit their being comfortably and simultaneously grasped by one hand of the user, said web member being capable of supporting said housing portions from a wheeled vehicle support member and being further capable of folding from view to provide the user with an article having the appearance and characteristics of a carrying bag.

3,989,175

DISPENSER FOR ADHESIVE PRODUCTS

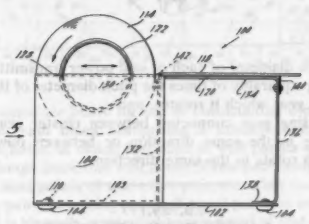
Phil Cherrin, Huntington Woods, Mich., assignor to Phil Cherrin, Huntington Woods; Abe Cherrin and Lem Cherrin, both of Southfield, all of, Mich.

Continuation-in-part of Ser. No. 368,206, June 8, 1973, abandoned. This application Nov. 6, 1974, Ser. No. 521,397

Int. Cl.² B26F *3/02*

U.S. Cl. 225—76 **1 Claim**

1. A dispenser for use with a roll of pressure-sensitive tape having a plurality of longitudinally spaced zones which appreciably increase the force required to strip the tape from the roll compared to the areas intermediate said zones, said zones being substantially equally spaced apart and of substantially equal predetermined longitudinal extent thereby defining a longitudinal repeat of predetermined length, said dispenser comprising; dispenser frame means, a lip on said frame means across which tape is drawn as tape is stripped from the roll, said lip extending continuously across said frame means; support means on said frame means arranged to rotatably support the roll of tape and maintain the same against said lip along a line of contact therebetween with tape being stripped from the roll along a line of departure substantially at said line of contact; severing means on said frame means operable along a line of severing extending across the tape; said line of contact of the roll with said lip being along a free edge of said lip, the lip having a convex curved surface curving away from said free edge and merging into a horizontal support surface defining the remainder of the path of travel of the tape between said lip and said severing means, the tape being drawn across said curved surface as it is stripped from the roll; said frame means comprising an elongated flat base, a pair of transverse spaced members comprising vertical walls extending upwardly from the rear portion of said base, said tape roll support means comprising a pair of inturned horizontal flanges along the upper portions of said vertical walls substantially at the level of said lip, an annular spindle rotatably supporting said tape roll, and means on said spindle slidably but non-rotatably mounting the spindle on said flanges, said last mentioned means comprising a pair of diametrically opposed slots on each side of said spindle and receiving said flanges, and said lip being disposed relative to said severing means such that the distance from the said severing means to said lip is positionable whereby a distance is maintained equal to a whole multiple of said predetermined length of said repeat less a distance smaller than said predetermined longitudinal extent of each zone.



3,989,176

WEB TRANSPORTING SYSTEM

Henry F. Hope, 3192 Huntingdon Road, Huntingdon Valley, Pa. 19006, and Stephen F. Hope, 2421 Wyandotte Road, Willow Grove, Pa. 19090

Continuation-in-part of Ser. Nos. 457,829, April 4, 1974, abandoned, and Ser. No. 513,244, Oct. 9, 1974. This application Mar. 10, 1975, Ser. No. 555,961

Int. Cl.² B65H *17/22*

U.S. Cl. 226—189 **101 Claims**

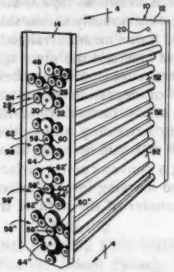
1. In a conveyor system for webs having a plurality of rotatable web transporting members, means for supporting said transporting members, and means for driving said transporting members at a speed as to cause uniform transport of the web, the improvement which comprises:

a plurality of power transmitting gears driven simultaneously,

means which drives the power gears and which are rotatable in a plane substantially parallel to the plane of rotation of the power gears,

a plurality of cluster drive gears coaxially rotated by respective power transmitting gears at the same rate of rotation,

a plurality of clusters of gears positioned to be driven by said cluster drive gears, at least some driven gears being connected to rotate transporting members,



the pitch diameter of each of said power transmitting gears being a plurality of times the pitch diameter of the cluster drive gear which it rotates, and

a reversing gear connected between cluster gears which rotate in the same direction or between power gears which rotate in the same direction.

3,989,177

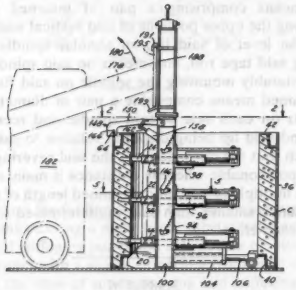
LADDER RUNG IMPLANTER

Edward P. Washabaugh, Jr., 401 Kelton St., Bay City, Mich. 48706

Filed Nov. 13, 1974, Ser. No. 523,438

Int. Cl.² B27F 7/02

U.S. Cl. 227—111 **16 Claims**



1. A manhole step implanter comprising in combination:

a step carrier for releasably supporting a step to be implanted,

means for supporting the step carrier within a green manhole section in a position for projecting the arm of a step carried by the carrier into an opposed wall,

said means including mechanism for shifting the carrier toward and away from the manhole wall to project into and embed the arm of a carried step in the wall,

said mechanism having locating means for engaging the manhold casting form to position the step carrier within the manhole section in predetermined relation with the manhole wall,

said locating means being arranged in vertically spaced apart relation along said mechanism for engaging the manhole casting from adjacent to the upper and lower ends thereof.

3,989,178

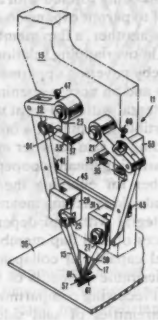
WIRE MAZE PENETRATING APPARATUS

David Erie Houser, Apalachin; Kenneth John Lubert, Endicott, and Richard Jay Morenus, Endwell, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,951

Int. Cl.² H05K 3/32

U.S. Cl. 228—4.5 **7 Claims**



1. Wire maze penetrating apparatus operative to remove wires from and open an area on a printed circuit board surface to permit the bonding of additional wire to the board surface, said apparatus comprising:

a pair of needle-like penetrating members each connected to a support member at one end, with the other ends of said penetrating members normally proximate each other;

means operative to position said apparatus above the area on the printed circuit board to which a bond is to be made;

means operative to bring said penetrating members into contact with the surface of the printed circuit board; and

pressure responsive apparatus connected to said support member and said penetrating members operative in response to pressure exerted on said penetrating members by said board surface to cause said penetrating members to spread apart and thereby open an area on said board surface.

3,989,179

METHODS OF DIP SOLDERING

John N. Antonevich, Jamestown, N.Y., assignor to Blackstone Corporation, Jamestown, N.Y.

Filed Sept. 9, 1975, Ser. No. 611,622

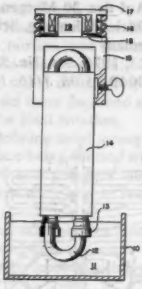
Int. Cl.² B23K 1/06, 1/08

U.S. Cl. 228—110 **6 Claims**

1. A method of eliminating "icicles" and drippings of solder from generally horizontally extending surfaces including U-shaped portions of heat exchangers and the like, which surfaces have been dipped in a molten bath of solder and removed from said solder bath comprising the steps of accelerating and decelerating the parts simultaneously with removing them from the solder bath and continuing to accelerate and decelerate the parts until all solder thereon has levelled itself over the dipped surfaces.

6. A method of eliminating "icicles" and drippings of solder from generally horizontally extending surfaces including U-shaped portions of heat exchangers and the like, which surfaces have been dipped in a molten bath of solder and removed from said solder bath comprising the steps of accelerat-

ing and decelerating said parts immediately after withdrawal from the solder bath and until the solder has levelled itself



over the dipped surfaces and the solidus temperature of the solder has been reached.

3,989,180

WAVE SOLDERING WITH SUPPORTED INCLINED WAVE

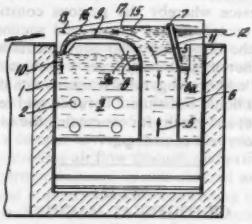
Louis V. Tardoskegyi, Montreal, Canada, assignor to Electrovert Manufacturing Company, Limited, Montreal, Canada

Continuation of Ser. No. 297,833, Oct. 16, 1972, abandoned. This application Jan. 24, 1975, Ser. No. 543,886

Claims priority, application United Kingdom, Nov. 10, 1971, 52316/71

Int. Cl.² B23K *1/08, 31/02*

U.S. Cl. 228—180 R **14 Claims**



1. In a method of processing workpieces, such as printed circuit boards, by passing the workpieces in contact with the upper surface of a standing wave of molten solder formed by circulating molten solder upwardly through a nozzle having a pair of opposite edges to overflow at least one edge thereof to form a standing wave, relatively elongated in a flow direction extending substantially horizontally and downwardly away from the associated edge, which is accelerated by gravity so that, if unsupported and out of contact with a workpiece, the wave has an upper surface ballistically curved downwardly in the direction of flow, the improvement comprising supporting the undersurface of the wave to have a relatively sharp curvature, in the direction of flow, adjacent the associated edge and thereafter to have a curvature, in the direction of flow, so chosen that, at every point along a major portion of the length of the standing wave, the distance between the upper and lower surfaces of the wave is such that the area of the active upper surface of the wave, along a major portion of its longitudinal extent in the direction of flow, is planar, with the cross-sectional area of the wave decreasing in the direction of flow, in the same manner as the cross sectional are of an unsupported wave following a ballistic curve in its trajectory, and passing the workpieces along a path of travel parallel to the planar portion of the active upper surface of the wave in a direction opposite to the flow direction of the wave while immersing the workpieces only slightly in the wave.

3,989,181

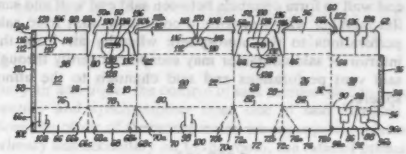
PARTITIONED CONTAINER HAVING SELF LOCKING TOP AND BOTTOM FORMING FLAPS

Thomas L. Wilcox, Indianapolis, and Ancil A. Jones, Mooresville, both of Ind., assignors to Inland Container Corporation, Indianapolis, Ind.

Filed Jan. 21, 1976, Ser. No. 650,892

Int. Cl.² B65D *5/10*

U.S. Cl. 229—39 R **19 Claims**



1. A container blank for use in constructing a partitioned container, said blank comprising a unitary sheet material which includes, in order, two pairs of wall panels secured on parallel hinge lines, one wall panel of one pair being disposed between said panels of said other pair, the other wall panel of said one pair comprising two wall panel portions one portion of which is hingedly connected to one panel of said other pair of wall panels, the other portion of said two wall panel portions being hingedly connected to the other one of said other pair of wall panels, one of said two wall panel portions having a partition panel hingedly secured thereto, a partition glue-flap hingedly secured to said partition panel, the other of said two wall panel portions having a container glue-flap, each wall panel of said two pairs of wall panels having top and bottom forming flaps hingedly secured to the opposite ends thereof along hinge lines substantially perpendicular to said hinge lines of said two pairs of wall panels, said top and bottom forming flaps being foldable to form closed top and bottom covers for a container formed from said blank, said partition panel having top and bottom partition flaps hingedly secured thereto along hinge lines substantially perpendicular to said hinge lines of said two pairs of wall panels, said top and bottom partition flaps each defining means adapted for interlocking cooperation, respectively, with selected ones of said top and bottom forming flaps to maintain said top and bottom forming flaps in their said folded positions when folded to form said closed top and bottom covers.

3,989,182

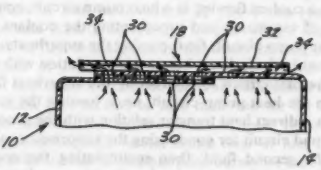
VENTED BAG

Robert J. Stearley, Des Moines, Iowa, assignor to Great Plains Bag Corporation, Des Moines, Iowa

Filed Feb. 12, 1976, Ser. No. 657,454

Int. Cl.² B65D *31/14*

U.S. Cl. 229—62.5 **6 Claims**



1. A vented bag comprising:

a front wall, a back wall, and opposite end walls forming an enclosed container;

at least one of said end walls having a plurality of venting perforations formed therein for providing communication between the interior of the container and the atmosphere;

said one end wall being comprised of first and second side flaps folded toward one another in an overlapping relationship and being adhered to one another;

said one end wall being further comprised of a pair of end flaps extending inwardly beneath said side flaps at the opposite ends thereof,

said perforations extending through said side flaps,

a flat member secured in overlapping position over said one end wall, and over said venting perforations, portions of said flat member being free from attachment to said one end wall to form channels between said end wall and said flat member which provide a communication from said perforations to the atmosphere whereby air from the interior of said container may escape outwardly through said vent perforations and said channels to the atmosphere.

3,989,183

METHOD AND APPARATUS EMPLOYING A HEAT PUMP FOR HEATING FLUIDS IN DIFFERENT FLOW CIRCUITS

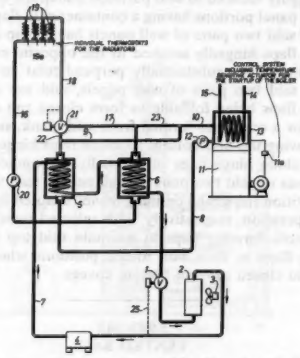
Berth Ulrik Gustafsson, Osterskar, Sweden, assignor to Projectus Industripdukter AB, Stockholm, Sweden

Filed Dec. 4, 1974, Ser. No. 529,527

Claims priority, application Sweden, Dec. 20, 1973, 73173163

Int. Cl.² G05D *23/02*

U.S. Cl. 237—2 B **6 Claims**



1. Method of heating a first fluid contained in a first circuit and a second fluid contained in a second circuit by using the heat from a coolant flowing in a heat pump circuit, comprising the steps of vaporizing and superheating the coolant flowing in the heat pump circuit; first, passing the superheated vaporized coolant in the indirect heat transfer relation with the first fluid in the first circuit for extracting the superheat from the coolant in the heat pump circuit; next, passing the vaporized coolant in indirect heat transfer relation with the second fluid in the second circuit for condensing the vaporized coolant and heating the second fluid; then recirculating the coolant to repeat the vaporizing and superheating step; and arranging a heat device in the path of the first circuit for selectively supplying heating to the first fluid flowing through the first circuit.

3,989,184

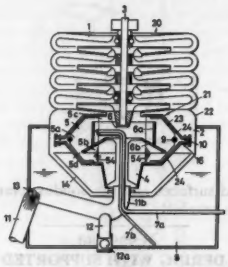
APPARATUS FOR COLLECTING AND CLASSIFYING A MIXTURE OF SOLID, GASEOUS AND LIQUID CONSTITUENTS

Hartmut Albishausen, Auf den 30 Morgen, 6382 Friedrichsdorf, and Karl-Ernst Meier-Dörnberg, Schullerstr. 19, 6101 Rossdorf, both of Germany

Filed June 23, 1975, Ser. No. 589,066

Int. Cl.² B04B *15/08, 1/16, 15/02*

U.S. Cl. 233—3 **39 Claims**



1. Apparatus for classifying a mixture of solid, liquid and gaseous constituents, particularly a vacuum cleaner, comprising a housing; a separating and conveying unit mounted in said housing and including a suction generating device, a rotary centrifuge adjacent to said device and a rotary gas separating device adjacent to said centrifuge; a pipe having a mixture-receiving inlet and an outlet communicating with said gas separating device so that the mixture enters said gas separating device as a result of suction produced by said suction generating device whereby the gaseous constituent passes through said centrifuge and enters said suction generating device while the liquid and solid constituents are separated from each other in said centrifuge; a receptacle for liquid constituent in said housing; tubular means establishing a path for the flow of liquid constituent between said receptacle and said centrifuge; and means for evacuating the separated solid constituent from said centrifuge.

3,989,185

CENTRIFUGAL MACHINE

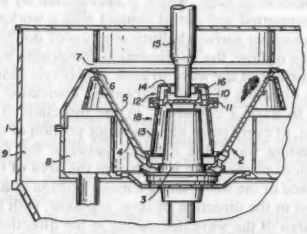
Andre Mercier, La Madeleine, France, assignor to Fives-Cail Babcock, Paris, France

Filed June 23, 1975, Ser. No. 589,349

Claims priority, application France, June 17, 1974, 74.20914

Int. Cl.² B04B *7/00, 11/06*

U.S. Cl. 233—27 **9 Claims**



1. A centrifugal machine comprising:

a. a bowl having a hub portion;

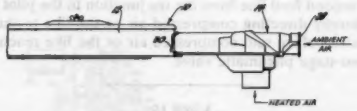
b. drive means for rotating said bowl continuously about an axis of rotation;
c. a receptacle mounted in said bowl for rotation therewith about said axis and having an axially terminal portion open in one axial direction;
d. a distributor having an inner face spacedly enveloping said terminal portion and flaring in an axial direction opposite to said one direction;
e. a plurality of radial arms interposed between said hub portion and said inner face and securing said distributor to said bowl for joint rotation,
1. said arms defining axial passages therebetween,
2. said inner face being formed with two recesses radially open toward said passages and axially open contiguously adjacent each arm in respective circumferential directions,
3. said arms and said recesses being located in a common radial plane; and
f. feeding means for feeding a slurry to said receptacle.

3,989,186

ENGINE INDUCTION AIR FLOW CONTROL

John D. McMichael, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 3, 1974, Ser. No. 502,652
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976
Int. Cl.² G05D *23/08*
U.S. Cl. 236—13 **4 Claims**



1. An internal combustion engine induction air flow control comprising means defining a generally horizontal air flow conduit having a primary air inlet and an air outlet at opposite ends thereof, an auxiliary air inlet below said air flow conduit, and a channel leading from said auxiliary air inlet upwardly to said conduit, a damper having a main portion disposed in said conduit for controlling air flow through said primary inlet and an auxiliary portion disposed in said channel and adapted to slide across said auxiliary inlet for controlling air flow therethrough independent of the rate of air flow therethrough, and pivot means mounting said damper for pivotal movement between a first position wherein said main portion obstructs air flow through said primary inlet and said auxiliary portion permits air flow through said auxiliary inlet and a second position wherein said main portion permits air flow through said primary inlet and said auxiliary portion obstructs air flow through said auxiliary inlet, whereby said damper may proportion air flow through said primary and auxiliary inlets independent of the rate of air flow through said auxiliary inlet.

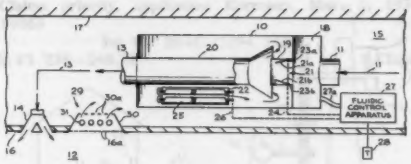
3,989,187

AIR-CONDITIONING SYSTEM APPARATUS

Gene W. Osheroff, Las Vegas, Nev., assignor to Fluidtech Corporation, Los Angeles, Calif.

Filed May 7, 1975, Ser. No. 575,463
Int. Cl.² F24F *3/00, 13/06*
U.S. Cl. 236—13 **16 Claims**

1. An air-conditioning system to which cool primary air and warm secondary air are supplied via respectively different paths, the system providing an appropriate mixtures of the cool and warm air to a room to be conditioned, said system comprising: a first damper mechanism mounted only in the path of the primary air and operable only to control the volume thereof flowing to the room; a second damper mechanism mounted only in the path of the secondary air and operable only to control the volume thereof flowing to the room; a thermovalve mechanism mounted in the room to be conditioned; and fluidic amplifier means coupled to said first and second damper mechanisms, coupled to said thermovalve and coupled to tap off a portion of the primary air flowing to the system, said fluidic amplifier means being operable in response to the flow thereto of said tapped-off portion of primary air and under the control of said thermovalve to simultaneously and synchronously open one of said dampers and close the other of them to provide an appropriate mixture of primary and secondary air to the room, the ratio of primary to secondary air corresponding to the difference between the ambient room temperature and the temperature setting of said thermovalve mechanism.

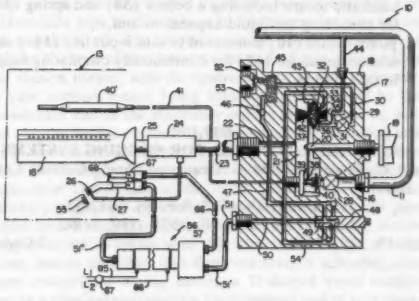


3,989,188

FUEL CONTROL SYSTEM AND METHOD OF OPERATING THE SAME AND DIVERTER VALVE THEREFOR

Charles D. Branson, Greensburg, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Mar. 17, 1975, Ser. No. 558,813
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² F23N *1/00*
U.S. Cl. 236—15 A **20 Claims**

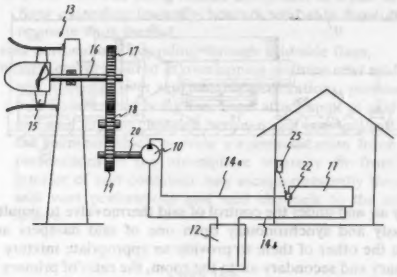


1. In a fuel control system for a main burner having a dual rate pilot burner and a control device for providing a standby flame flow of fuel to said pilot burner when the output temperature effect of said main burner is above the temperature setting of said control device and for providing a large heater flame flow of fuel to said pilot burner when the output temperature effect of said main burner is below the temperature setting of said control device so that only said heater flame will cause a main flow of fuel to said main burner for a heating operation thereof, the improvement wherein means is provided for diverting said heater flame flow of fuel from said dual rate pilot burner to another pilot burner so that said main flow of fuel to said main burner will cease even though the output temperature effect of said main burner is below the temperature setting of said control device.

3,989,189
HEATING SYSTEM

Yasuo Kita, Kyoto, Japan, assignor to Shimadzu Seisakusho Ltd., Kyoto, Japan

Filed Apr. 16, 1975, Ser. No. 568,792
Int. Cl.² F22B *3/06*; F24C *9/00*
U.S. Cl. 237—1 R **7 Claims**

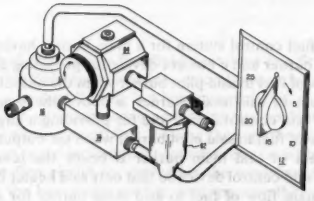


1. A closed loop heating system comprising in combination:
a. an elongated heat generating chamber (11) having external fins (24) around the chamber periphery, said chamber (11) having input and output pipe lines (14*a*, 14*b*);
b. valve means in said input line (14*a*) including an orifice (22) leading into said chamber (11), a valve housing disposed next to said orifice, a rotatable shaft (27) in said housing, handle means (26) connected to one end of said shaft (27), a flange (31) on said shaft to determine the limit of motion thereof, and a sluice board (28) in threaded engagement with said shaft, said sluice board (28) penetrating said aperture (22) controlling fluid flow thereinto;
c. a heat accumulator (12) connected to said output line (14*b*) comprising a container (29) connected to said output line (14*b*) said container (29) having therein adiabatic means including a bellow (34) and spring (35) for absorbing the liquid expansion; and,
d. pump means (10) connected to said input line (14*a*) and said accumulator (12) for continuously circulating liquid in said system.

3,989,190
MECHANICAL CONTROL FOR FOGGING SYSTEMS

Paul G. Englehart, 984 S. Grapevine Road, Golden, Colo. 80401

Filed Mar. 25, 1975, Ser. No. 561,862
Int. Cl.² A01G *27/00*; B05B *1/30*, *12/02*
U.S. Cl. 239—70 **7 Claims**

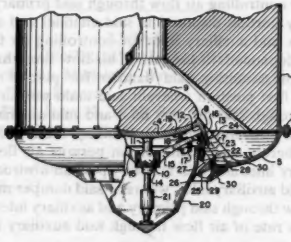


1. A control mechanism for use with a portable fogging system, which portable fogging system comprises an insecticide storage tank mounted to a transportable cart and a multiplicity of nozzles, said control mechanism comprising:
a. A mechanical clock-operated timer having a range of from a minimum of zero to fifteen minutes to a maximum of from zero to thirty minutes;
b. A rotary cam device mechanically joined to the mechanical timer comprising a circular disc including a circumferential surface and a single circumferential indentation;
c. A cam follower interacting with the rotary cam device comprising a pin engaging first the circumferential surface and second the circumferential indentation of the circular disc respectively and a bearing surface remote from the pin but attached to the pin;
d. A first rotating lever and a second rotating lever rigidly joined by a rotating shaft so that the first rotating lever and the second rotating lever rotate in the same direction, said rotating shaft rotating within a bearing housing on a dust proof bearing surface, the said first rotating lever engaging the bearing surface of the cam follower and being rotated by the bearing surface of the cam follower;
e. A normally closed pilot valve comprising an inlet port, an outlet port and an actuating means, said actuating means interacting with the second rotating lever only to open the normally closed pilot valve;
f. A two-stage pneumatic valve, which pneumatic valve controls the flow of compressed air or the like from an external source to the nozzles of the portable fogging system and which pneumatic valve is pneumatically connected with the pilot valve and actuated solely by the pilot valve;
g. A feed line from the external source to the two-stage pneumatic valve, which feed line includes a tee junction between the external source and the pneumatic valve and a second feed line from the tee junction to the pilot valve, thereby directing compressed air or the like to the pilot valve before said compressed air or the like reaches the two-stage pneumatic valve.

3,989,191
THRUST CONTROL NOZZLE FOR ROCKETS

Edward E. McCullough, Brigham City, Utah, assignor to Thiokol Corporation, Newtown, Pa.

Filed Sept. 13, 1971, Ser. No. 179,792
Int. Cl.² B64C *15/08*; B63H *11/10*
U.S. Cl. 239—265.15 **5 Claims**



1. A thrust nozzle apparatus for rockets comprising:
a centrally apertured aft closure;
a recessed aft closure section, having an aftwardly-extending, annular flange fixed to the edge thereof, spaced inwardly from the apertured aft closure by brackets fixed to the flange and to the aft closure;
a ball joint having a short shaft fixed centrally to the aft side of the recessed aft closure section;
a socket on the ball joint;
a sleeve concentric about the ball joint and operatively attached to the socket, the sleeve having an outer surface conforming to a spherical surface concentric about the ball joint and fitting a similar spherical surface on the inside of the flange on the recessed aft closure section in sealed relationship therewith;

a hollow, spike nozzle member having a lip on the edge thereof that fits in sealed relationship with a cylindrical surface on the inside of the sleeve;

an annular cowl surrounding the spike nozzle member and spaced therefrom by brackets attached to the sleeve;

sealing means between the cowl and the apertured aft closure;

a primary, fluid-operated actuator centrally attaching the hollow spike nozzle member to the socket joint for moving the spike nozzle member axially relative to the cowl, whereby the throat formed therebetween may be varied in size to vary the magnitude of thrust of the rocket; and

secondary actuators operatively attached to the sleeve and having actuation arms that may bear against the recessed aft closure, whereby the sleeve, the spike nozzle member, and the cowl may be rotated as a unit about the ball joint to change the direction of thrust of the rocket.

3,989,192

DEVICE FOR VARYING THE GAS EXIT AREA OF AN EXHAUST NOZZLE FOR A JET DEFLECTING DEVICE

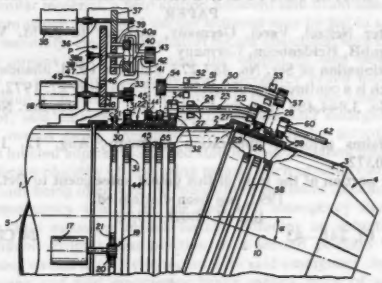
Heinrich Enderle, Munich, and Alfred Jabs, Groebenzell, both of Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH M.A.N. Maybach Mercedes-Benz, Munich, Germany

Filed Feb. 28, 1975, Ser. No. 553,884

Claims priority, application Germany, Mar. 2, 1974, 2410161

Int. Cl.² B64C *15/08*

U.S. Cl. 239—265.35 **11 Claims**



1. An apparatus for the adjustment of the rotational position of a jet deflection device and for the adjustment of the exit area size of a nozzle forming part of said jet deflection device, comprising a stationary jet pipe section (1), a first rotatable jet pipe section (2) rotatably secured to said stationary jet pipe section, a second rotatable jet pipe section (3) rotatably secured to said first rotatable jet pipe section, and a nozzle secured to said second rotatable jet pipe section, a first drive motor (17) and first power transmission means (20, 21) operatively interconnecting said first drive motor and said first rotatable jet pipe section (2) for rotating the latter relative to the stationary jet pipe section (1), a second drive motor (18) and second power transmission means (31, 32, 33, 34, 23, 28, 29) including first flexible means operatively interconnecting said second drive motor and said second rotatable jet pipe section (3) for rotating the latter relative to the first rotatable jet pipe section (2); area size adjusting means (68, 72, 73) and a third drive motor (35) as well as third power transmission means (P, 43, 45, 55, 54, 50, 57, 48, 59...), including second flexible means operatively interposed between said third drive motor (35) and said area size adjustment means, whereby said rotating of said first and second jet pipe sections and said area size adjustment may be made independently of each other and in any position of said rotatable jet pipe sections.

3,989,193

DEVICE FOR VARYING THE GAS EXIT AREA OF AN EXHAUST NOZZLE FOR A JET DEFLECTING DEVICE

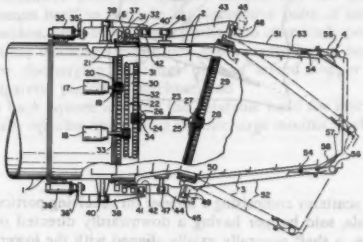
Ralph Vedova, Munich, and Alfred Jabs, Groebenzell, both of Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH M.A.N. Maybach Mercedes-Benz, Munich, Germany

Filed Feb. 24, 1975, Ser. No. 552,321

Claims priority, application Germany, Mar. 2, 1974, 2410069

Int. Cl.² B64C *15/04, 15/06*

U.S. Cl. 239—265.35 **9 Claims**

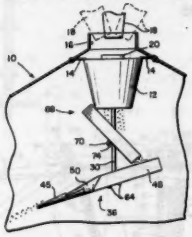


1. In a device for varying the gas exit area of an exhaust nozzle, including stationary engine jet pipe means, a jet deflecting apparatus having intermediate pipe section means between said stationary engine jet pipe means and said exhaust nozzle, bearing means rotatably interconnecting said intermediate pipe section means to said engine jet pipe means and to said nozzle for relative rotation about an axis at an angle to the axis of the downstream end of said intermediate pipe section means, with the upstream end of said intermediate pipe section means being rotatably intercoupled to the downstream end of the stationary engine jet pipe means; said area varying device comprising first and second actuating arm means, means mounting said first and second actuating arm means for sliding movement in the direction of the respective longitudinal center line at the outer circumference of said stationary engine jet pipe means and said intermediate pipe section means respectively, said second actuating arm means being mounted to rotate with said intermediate pipe section means, means coupling said first and second actuating arm means comprising a ring having a U-shaped cross section forming a channel surrounding the upstream end of said intermediate pipe section means coaxially therewith and affixed to one of said first and second actuating arm means, and a roller on the end of the other of said first and second actuating arm means engaging said channel, driving means on said stationary engine jet pipe means coupled to longitudinally move said first actuating arm means in a direction parallel to the longitudinal center line of said stationary engine jet pipe means, a support ring arranged coaxially to said bearing means, guide rollers on said support ring, a ring having a U-shaped cross section forming a channel affixed to the downstream end of said second arm means and engaging said rollers on said support ring, an axially sliding nozzle actuating skirt at the downstream end of said rearmost pipe section means, means coupling said support ring to axially move said nozzle actuating skirt, and flap means mounted at the downstream end of said rearmost pipe section means and operatively coupled to said nozzle actuating skirt.

3,989,194
GRAIN SCATTERER

Wallace R. Parker, R.R. No. 2, Box 252, Coatesville, Ind. 46121

Filed Mar. 3, 1976, Ser. No. 663,363
Int. Cl.² B65G 65/32; A01C 17/00
U.S. Cl. 239—666 9 Claims



1. A scatterer comprising a hopper for receiving particulate materials, said hopper having a downwardly directed outlet opening, a shaft generally axially aligned with the lower end of said hopper and said outlet opening, means for driving said shaft, a plate disposed below said hopper to receive such material therefrom, means for connecting said plate to said shaft for rotation therewith, said plate being tilted on said shaft to have an upper end, a generally diametrically opposed lower discharge end, and opposite side flange means extending between said ends, in which the improvement comprises an intermediate chute, means for mounting said intermediate chute on said shaft for rotation therewith, said chute being between said outlet opening and said plate, said chute being tilted on said shaft opposite to the direction of tilting of said plate to have an upper end generally above the lower discharge end of said plate and a diametrically opposite lower discharge end generally above the upper end of said plate, said chute being positioned to receive such material from said hopper outlet opening to direct it downwardly on the upper end of said plate.

3,989,195
PRODUCTION OF AQUEOUS CALCIUM CARBONATE SUSPENSIONS

Hugh Robin Falcon-Steward, St. Austell, England, assignor to English Clays Lovering Pochin & Company Limited, England

Filed Dec. 15, 1975, Ser. No. 640,699
Claims priority, application United Kingdom, Jan. 3, 1975, 308/75
Int. Cl.² B02C 28/00
U.S. Cl. 241—16 6 Claims

1. In a method of producing an easily pumpable aqueous suspension of a natural calcium carbonate material containing at least 60% by weight of particles smaller than 2 microns equivalent spherical diameter, the improvement which comprises the steps of:

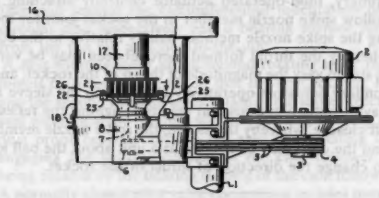
a. forming an aqueous suspension of natural calcium carbonate material containing 60% by weight of particles smaller than 2 microns equivalent spherical diameter and a minor amount of a compound which contains calcium ions or carbonate ions and has a solubility in water of at least 0.05 g per 100 ml of water at 25° C; and thereafter

b. deflocculating the natural calcium carbonate material in said aqueous suspension with a dispersing agent.

3,989,196
CUTTER HEAD

Joe R. Urschel, 202 Michigan, Valparaiso, Ind. 46383

Filed Apr. 9, 1975, Ser. No. 566,257
Int. Cl.² B02C 13/282
U.S. Cl. 241—27 17 Claims

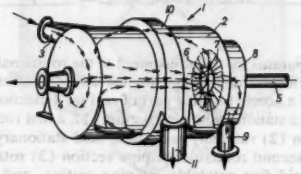


1. A method of cutting a product in a cylindrical cutter head provided with a plurality of discharge openings separated longitudinally by circumferentially extending partitions having inner abutments and outwardly extending generally converging surfaces and the head has cutting edges adjacent the openings, which comprises rotating the product in the head so that the abutments form grooves in the product and the cutting edges subsequently cut the grooved portions of the product into pieces for flow through the openings in a manner whereby the pieces substantially avoid said converging surfaces.

3,989,197
APPARATUS FOR PULPING AND GRADING OF WASTE PAPER

Walter Neitzel, Varel, Germany, assignor to J. M. Voith GmbH, Heidenheim, Germany

Continuation of Ser. No. 487,273, July 10, 1974, abandoned, which is a continuation of Ser. No. 275,830, July 27, 1972, Pat. No. 3,844,488. This application Jan. 13, 1975, Ser. No. 540,668
Claims priority, application Germany, Aug. 12, 1971, 2140372
The portion of the term of this patent subsequent to Oct. 29, 1991, has been disclaimed.
Int. Cl.² B02C 13/02
U.S. Cl. 241—43 24 Claims



1. In an apparatus for the comminution and grading of waste material, particularly for the pulping and grading of waste paper, a combination comprising at least the closed pressurized receptacle for receiving a waste material suspension, said receptacle having wall means including a peripheral wall and two oppositely located end walls; rotor means located in said receptacle adjacent one of said end walls for comminuting the waste material in said suspension so as to obtain a stock component, an impurity component of low specific gravity which is in the form of a suspension and an impurity component of high specific gravity; first outlet means provided in said wall means in the region of said rotor means for discharge of said stock component from said receptacle; strainer means for straining of the stock component discharged through said first outlet means; second outlet means provided in the other of said end walls for discharge from said receptacle of said impu-

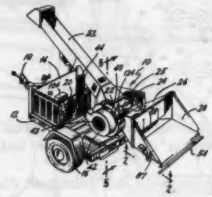
rity component of low specific of low specific gravity; means for regulating the discharge of said impurity component of low specific gravity through said second outlet means; and third outlet means provided in said wall means for discharge from said receptacle of said impurity component of high specific gravity.

3,989,198

BRUSH CHIPPER AND BRAKE ASSEMBLY USABLE THEREWITH

Andrew G. Blasko, Riegelsville, Pa., assignor to Asplundh Tree Expert Company, Willow Grove, Pa.

Filed Apr. 16, 1975, Ser. No. 568,706
Int. Cl.² B02C *23/04*
U.S. Cl. 241—101.7 **16 Claims**



1. A brush chipper or the like comprising power means operatively associated with a rotatable drum assembly for rotating said drum assembly about its axis, said drum assembly including cutting means rotatable therewith for cutting brush and similar material, a feed station adjacent said drum assembly from which brush and similar material may be fed to said drum assembly, emergency shutoff means associated with said power means for discontinuing the output of said power means to said drum assembly and emergency brake means associated with said drum assembly for stopping the rotation thereof, said emergency shutoff means and said emergency brake means being energized simultaneously by actuating means located adjacent said feed station, said actuating means including a plurality of operating means, each of said operating means being operative independent of the other to actuate said emergency shutoff means and said emergency brake means, said actuating means further including an actuating rod slidable from a first position to a second position for operating switch means connected with said emergency shutoff means and said emergency brake means, each of said operating means being arranged to slide said actuating rod from said first position to said second position without causing movement of the other said operating means.

3,989,199

APPARATUS WITH A ROTATABLE HEAD FOR SUPPLYING CIGARETTES TO THE INFEED HOPPERS ON HIGH SPEED CIGARETTE PACKETING MACHINES

Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Italy

Filed Mar. 17, 1975, Ser. No. 558,917
Claims priority, application Italy, Apr. 8, 1974, 3347/74
Int. Cl.² B65F *3/02*
U.S. Cl. 214—302 **3 Claims**

1. Apparatus for transferring cigarettes to an infeed hopper of a cigarette packeting machine, comprising;

a conveyor movable in a succession of longitudinal steps for delivering cigarette containers aligned parallel with one another on and transversely of the conveyor, each container being substantially as wide as each of the cigarettes is long and having an aperture for enabling gravitational discharge of the cigarettes from the container through the aperture;

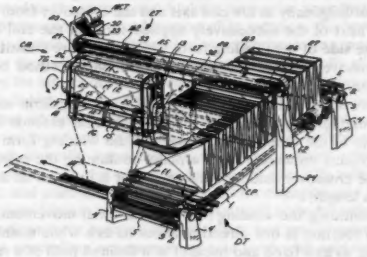
a rotatable, generally box-shaped head disposed adjacent one side of the conveyor, having two ends, recessed sides therebetween and an axis extending between the two ends, each recessed side defining a cavity receptive, through one of the ends, of one of the cigarette containers and which has a discharge mouth substantially coincident with the aperture of the received container, the discharge mouths being provided opposite one another in respective ones of the cavities;

a fixed structure supporting the head for rotation about said axis;

transfer means for successive pairs of transfer strokes and for transferring in each pair of transfer strokes a container filled with cigarettes from the conveyor into one of the two cavities of the head and a container emptied of cigarettes from the other cavity back to the conveyor;

electromechanical means for synchronously intermittently operating (a) the conveyor to deliver successive filled containers to the transfer means and successive emptied containers from the transfer means, (b) the transfer means itself to perform the successive pairs of transfer strokes, and (c) the rotatable head to alternately position either discharge mouth in a downwardly facing position for discharging cigarettes into an infeed hopper of a cigarette packeting machine; and

two back square units on the rotatable head for mechanically opening and closing the discharge mouths, each unit



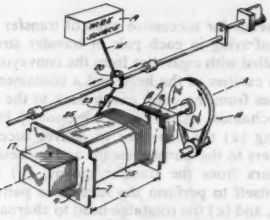
comprising a closure member for selectively opening and closing one of the discharge mouths, arms extending from the closure member to pivot ends, a shaft extending through the pivot ends of the arms and to the ends of the head and pivotally supported on each of those ends, a spring for resiliently biasing the shaft with the arms and the closure member to close the discharge mouth by the closure member, and feeler means disposed at one end of the head, opposite the fixed structure, for mechanically feeling a completion of each successive rotation of the head and the corresponding positioning of either discharge mouth in a downwardly facing position, to rotate the corresponding shaft and arms, against the biasing of the corresponding spring, and thereby to move the respective closure member to open its discharge mouth, the feeler means including two levers, one secured to an end of the shaft of each back square unit, each lever cantilevering from its shaft, opposite one of the ends of the head, and an arcuate guide rail on the fixed structure opposite said one end of the head and concentric with the axis of the head, the guide rail being normally engageable with a free end of each lever and having an end portion disengageable therefrom to enable resilient closing of each discharge mouth by the respective closure member and spring on inception of the next rotation of the head.

3,989,200

NON-CIRCULAR PERFECT LAYER ELECTRICAL COILS

Robert W. Bachi, Itasca, Ill., assignor to Bachi, Inc., Itasca, Ill.

Filed Apr. 22, 1975, Ser. No. 570,477
Int. Cl.[2] H01F *41/06, 27/28;* B65H *75/14*
U.S. Cl. 242—7.03 7 Claims



6. A method of winding a wire coil on a polygonal winding form having a plurality of sides that are disposed symmetrically to the axis of the winding form, each side having leading and trailing edges relative to rotation of the winding form about its axis, said edges being defined by the junctions of the sides with their respective adjacent sides, said winding form also having axially spaced flanges to define the ends of the coil, said method producing a perfect layer coil in which the coil portions at all but one side of the winding form are disposed orthogonally to the coil axis and the crossover from one to the next of the successively applied turns of the coil is at said one side of the winding form which therefore constitutes the crossover side of the winding form, said method being characterized by:

A. providing the crossover side of the winding form with a longitudinally extending wire support that extends from one to the other of the flanges of the winding form and projects outwardly from a plane containing the edges of the crossover side by a distance that is uniform all along its length;

B. confining the winding form against axial movement and to rotation in one direction about its axis while maintaining its axis fixed and parallel to a defined path of a reciprocable wire guide;

C. securing to the winding form, at a point thereon adjacent to one of its flanges and near the leading edge of its crossover side, the free edge of a length of wire that extends from the wire guide;

D. with the wire guide stationary at a defined location in which it holds said length of wire in a plane normal to the axis of the winding form and directly contiguous to said one flange, rotating the winding form in the direction to which it is confined to thereby cause wire of said length thereof to lay itself successively across all but the crossover side of the winding form and in direct contiguity to said one flange;

E. continuing rotation of the winding form to cause said wire to wrap itself around the leading edge of the crossover side of the bobbin and lay itself transversely across said crossover side with the point of contact between the wire and the winding form being shifted progressively from the leading edge to the trailing edge of the crossover side by reason of the presence of the wire support thereon;

F. substantially at the instant the wire wraps itself around the leading edge of the crossover side of the winding form, initiating a steady constant movement of the wire guide along its defined path from its aforesaid defined position towards the other flange of the winding form at a rate of one wire diameter per complete revolution of the winding form; and

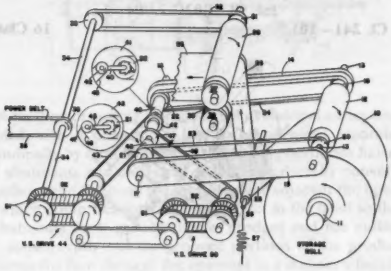
G. continuing said rotation of the winding form and said movement of the wire guide to thereby lay successive turns of the coil onto the winding form until the first layer of the coil has been completed.

3,989,201

FILM DRIVING MECHANISM FOR HIGH INERTIA STORAGE ROLLS

Edward D. Cottrell, Cattaraugus, N.Y., assignor to Champion International Corporation, Stamford, Conn.

Filed Nov. 22, 1974, Ser. No. 526,264
Int. Cl.[2] B65H *23/08, 23/18*
U.S. Cl. 242—55 9 Claims



1. A film driving mechanism for unwinding a storage roll having high inertia comprising:

a. a power source including a main drive means;

b. a normal unwind mechanism including a pair of squeeze rolls coupled to said main drive means for drawing the film from the storage roll at a substantially constant speed;

c. a friction roll coupled to said main drive means and pressed into contact with the storage roll, which friction roll normally runs at the speed of said normal unwind mechanism;

d. a first auxiliary drive means coupled to said main drive means and operative to reduce the speed of the friction roll in response to said friction roll increasing its speed beyond a pre-determined acceleration value, said first auxilliary drive means including a first clutch overdrive coupled between said friction roll and the main drive means of the power source, with said first clutch overdrive being operative to reduce the drive speed of the friction roll by less than 5 percent of the normal speed; and

e. a second auxiliary drive means coupled to said main drive means and operative to increase the speed of the friction roll in response to said friction roll decreasing its speed beyond a pre-determined deceleration value, said second auxiliary drive means including a second clutch overdrive coupled between said friction roll and the main drive means of the power source, with said second clutch overdrive being operative to increase the speed of the friction roll by less than 5 percent of the normal speed.

3,989,202

APPARATUS FOR WINDING AND UNWINDING A BAND

Oskar Noé, and Heinz Wilhelm Berger, both of Mulheim (Ruhr), Germany, assignors to BGW Bergwerk-und Walzwerk Maschinenbau G.m.b.H., Duisburg, Germany

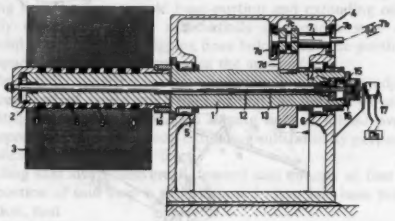
Filed Oct. 16, 1975, Ser. No. 622,979
Claims priority, application Germany, June 21, 1975, 2527690
Int. Cl.[2] B65H *75/18, 17/02*
U.S. Cl. 242—72 R 10 Claims

1. An apparatus for winding a band, said apparatus comprising:

a support,

a shaft having a longitudinal axis and rotatable on said support about said axis,

a plurality of axially spaced relatively noncompressible rings surrounding said shaft,



a plurality of axially spaced elastomeric rings surrounding said shaft and interleaved with said noncompressible rings, and

means for axially displacing said noncompressible rings and thereby axially compressing said elastomeric rings to force same radially outwardly.

3,989,203

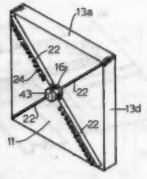
CREEL FOR PILE FABRICS HAVING FOLD-UP END ASSEMBLIES

Clarence Orville Williams, 3617 Sheffield Drive, Rocky Mount, N.C. 27801

Filed June 2, 1975, Ser. No. 582,984

Int. Cl.² B65H *75/02*

U.S. Cl. 242—77.1 **16 Claims**



1. A creel for pile fabrics, and the like, comprising, in combination:

a. two box-like structural end members folded into structural form from blanks of foldable sheet material with each end member having a rectangular rear tension panel spaced from, integrally connected to and disposed opposite and parallel to a rectangular front compression panel of similar size;

b. a set of plural hook strips for each end member, said strips having hooks for receiving convolutions of pile fabric and the like, and each set of strips being secured in a radial arrangement, with the inner ends thereof spaced, on a respective outer front panel surface of a said end member;

c. a spreader arm; and

d. means for securing the ends of said spreader arm to said end members to hold said end members in spaced relation with said front panels opposed.

3,989,204

FLY FISHING REEL

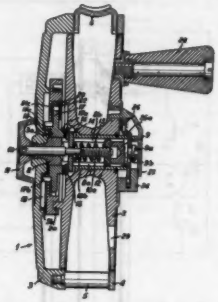
Jean-Paul Lémery, Cluses, France, assignor to Carpano & Pons S.A., France

Continuation of Ser. No. 788,116, Dec. 23, 1968, abandoned. This application Feb. 11, 1971, Ser. No. 114,727

Claims priority, application France, Jan. 5, 1968, 68.134935

Int. Cl.² A01K *89/02*

U.S. Cl. 242—84.5 R **8 Claims**



1. In a fly fishing reel including a casing, a spool rotatably mounted to the casing, and braking means for impeding rotation of the spool in one direction of its rotation, the improvement wherein said braking means comprise a ring mounted within the casing for rotation with said spool, axially slidable means for interconnecting said ring to said spool during use of the fly fishing reel to effect rotation of said ring in response to rotation of said spool and for permitting said spool to be removed from said ring during non-use of the fly fishing reel, a pawl pivotally connected to said ring, a plate rotatably mounted within the casing and disposed coaxially with said spool, said plate having ratchet means for engaging said pawl, adjustable friction means connected to said plate for adjusting the resistance to rotation of said plate, and pawl-controlling means controlling engagement of said pawl with said ratchet means of said plate, said pawl-controlling means comprising a U-shaped spring member pivoted on said ring coaxially with said pawl and having opposite leg portions frictionally gripping said plate between them such that the friction engagement of said plate with said leg portions effects movement of said pawl to a position out of engagement with said ratchet means when said spool is rotated in one direction and into engagement with said ratchet means when said spool is rotated in the opposite direction, whereby said pawl and ratchet disengagement and engagement permit said plate to remain stationary when said spool is rotated in one direction, and causes said plate to rotate with said ring and spool when said spool is rotated in the other direction.

3,989,205

MANDREL FOR COLLECTING WIRE COILS

Hans Wilhelm Jacobszoon, Saarbrucken-Fechingen, Germany, assignor to Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Germany

Filed May 7, 1975, Ser. No. 575,175

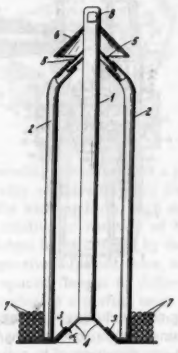
Claims priority, application Germany, May 13, 1974, 2423009

Int. Cl.² B65H *49/00*

U.S. Cl. 242—129 **4 Claims**

1. A device for collecting the fan-like wire coils from a rolling train and forming the coils into a bundle or ring, said device comprising an axially extending mandrel having a first end and a second end with the second end located downstream from the first end relative to the direction in which the

coils move over said mandrel, wherein the improvement comprises a plurality of stringers spaced radially outwardly from and extending in the same general direction as the axial direction of said mandrel, and means for supporting said stringers for movement in the radial direction relative to the axis of said mandrel, said means comprising a support member located at the second end of said mandrel with said support member having a support surface disposed at an oblique angle to the axis of said mandrel, each said stringer having a guide rail at one end extending in generally parallel relation with the support surface of said support member and in contact with the



support surface, a guide device secured to said mandrel adjacent the first end thereof, each of said stringers at the opposite end from said guide rail being movably supported on said guide device so that each said stringer can move radially inwardly and outwardly relative to the axis of said mandrel supported by said support member and guide device, said guide device comprising a guide element for each said stringer, each said guide element arranged to interengage with the end of said stringer with which it is associated so that said stringer can be moved relative to said guide element along a line generally parallel to the direction of said guide rail on said support surface.

3,989,206

ROTATING LAUNCH DEVICE FOR A REMOTELY PILOTED AIRCRAFT

Thomas J. Gregory, Saratoga, Calif., assignor to The United States of America as represented by the Administrator of the United States National Aeronautics and Space Administration, Washington, D.C.

Filed Aug. 28, 1975, Ser. No. 608,483
Int. Cl.² B64F *1/06*
U.S. Cl. 244—63 **13 Claims**

1. Apparatus for launching a remotely piloted aircraft from a launch site comprising:

a. a rotatable arm having first and second ends;

b. means to support the rotatable arm such that the arm rotates in a plane disposed obliquely to the gravitational field at the launch site;

c. means to releasably attach the remotely piloted aircraft to a first end of the arm such that thrust generated by the aircraft powerplant causes the rotatable arm to rotate;

d. a counterweight;

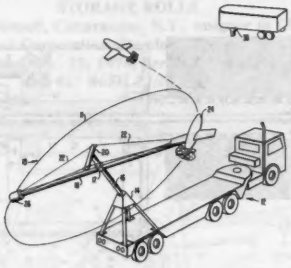
e. means to releasably attach the counterweight to a second end of the arm; and

f. means to simultaneously release the attachment means for the aircraft and the counterweight so as to release them from their respective ends of the arm at a predetermined point on the circular path of travel.

13. A method for launching a remotely piloted aircraft from a launch site comprising the steps of:

a. attaching the aircraft to one end of a rotatable arm;

b. attaching a counterweight to the other end of the rotatable arm;



c. rotating the arm about a fixed axis such that the aircraft travels in a circular path, the plane of the circular path being disposed obliquely to the local gravitational field of the launch site; and

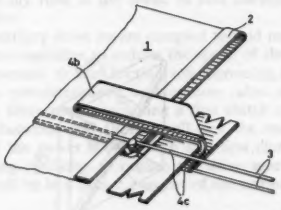
d. simultaneously releasing the aircraft and counterweight from the arm at predetermined points on the circular path of travel.

3,989,207

PARACHUTE WITH DELAYED OPENING

Heinz B. Mader, Braunschweig, Germany, assignor to Bruggemann & Brand KG, Wetter, Ruhr, Germany

Filed Dec. 17, 1974, Ser. No. 533,532
Int. Cl.² B64D *17/76*
U.S. Cl. 244—152 **7 Claims**



1. A parachute comprising:

a substantially circular canopy terminating in a base portion, at least said base portion of said canopy being formed of a first fabric,

a plurality of rigging lines secured to said base portion and extending outwardly therefrom,

a substantially continuous strip of material attached to said rigging lines below said canopy and spaced from said base portion a first distance, adjacent of said rigging lines being attached to said strip at intervals of a second distance, said strip being of a particular width measured parallel to said rigging lines and being formed of a second fabric having a coefficient of friction greater than the coefficient of friction of said first fabric,

said first distance, said second distance and said width being dimensionally so related as to allow, when a pair of adjacent of said rigging lines are substantially superimposed upon each other so that the base portion of said canopy and the portion of said strip therebetween are each folded over upon themselves, the said folded over portion of said strip can be placed radially inwardly of said base portion

in superimposed relationship to said base portion with the area of said strip superimposed upon said base portion sufficient to establish a frictional interrelationship with said base portion when said parachute is packed of such magnitude as to delay the opening of said folded over base portion of said canopy.

7. A method for folding a parachute having a substantially circular canopy terminating in a base portion, a plurality of rigging lines secured to said base portion and extending outwardly therefrom, and a substantially continuous strip of material attached to said rigging lines below said base portion and spaced therefrom, comprising the steps of:

substantially superimposing one rigging line upon an adjacent one of said rigging lines so that the portion of said strip disposed between said rigging lines is folded over upon itself to form a loop extending substantially perpendicular to said rigging lines,

folding said loop transversely toward said canopy so that a portion of said loop is superimposed upon said base portion, and

folding said base portion over upon itself so that said portion of said loop is integral between folds of said base portion of said canopy,

whereby when said canopy is opened in use the frictional engagement between said portion of said loop and said base portion inhibits the opening of said base portion of said canopy.

3,989,208

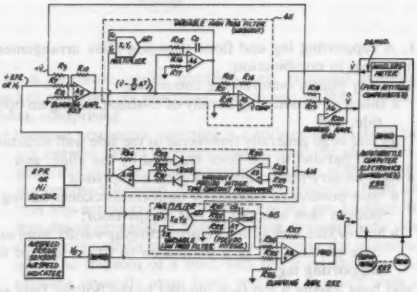
THRUST AND FLIGHT PATH CONTROL DECOUPLING SYSTEM

Antonius A. Lambregts, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 307,286, Nov. 16, 1972, abandoned. This application Mar. 17, 1975, Ser. No. 558,757

Int. Cl.² G05D *1/08*

U.S. Cl. 244—182 **17 Claims**



10. In combination in an aircraft longitudinal axis control system having a thrust control system responsive to a thrust control reference signal and a thrust control damping signal, the improvement comprising:

means for developing a signal representative of the rate change of the sum of the kinetic energy and potential energy of said aircraft for providing said thrust control damping signal.

3,989,209

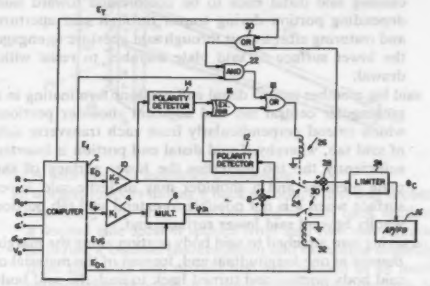
APPARATUS FOR GUIDING AN AIRCRAFT ALONG A MULTI-SEGMENT PATH WHEN LANDING THE CRAFT

Martin W. Feintuch, Paramus, and Mark Kaplan, North Bergen, both of N.J., assignors to The Bendix Corporation, Teterboro, N.J.

Filed June 26, 1974, Ser. No. 483,348

Int. Cl.² G05D *1/12*

U.S. Cl. 244—184 **12 Claims**



1. Apparatus for controlling an aircraft to fly a multi-segment path, comprising:

signal providing means for providing a signal corresponding to the bearing of the craft relative to a segment to be captured, a signal corresponding to the ground speed of the craft; and a signal corresponding to the displacement of the craft from the segment at which a turn is initiated to capture the segment;

means for combining the bearing signal and the ground speed signal;

aircraft control means; and

normally open switching means connecting the combining means and the control means, and connected to the signal providing means and closed by the turn displacement signal therefrom at a predetermined level for applying the combined signal to the control means for controlling the craft.

3,989,210

CABLE CLAMP AND STRAIN RELIEF DEVICE

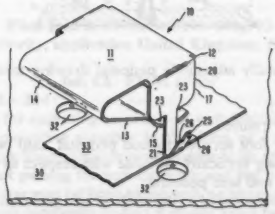
John Worrall Berkman, Thousand Oaks, Calif., and Frederic Cyrus Pexton, Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 5, 1974, Ser. No. 494,806

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² F16L *3/08*

U.S. Cl. 248—73 **3 Claims**



1. In combination with a plate member having upper and lower surfaces and a pair of spaced apertures therethrough, a cable clamp and strain relief device comprising

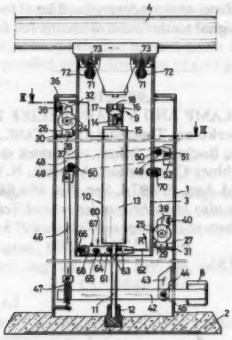
a body portion;
a pair of depending resilient leg members respectively disposed at and connected to opposite transverse margins of said body portion,
said leg members each having a distal end portion turned back on itself to form an acute angle with the depending portion,
said device being adapted for connection to said plate member by insertion of said depending leg member respectively through said pairs of apertures from the top surface causing said distal ends to be compressed toward said depending portion during transit through said aperture and restoring after transit through said aperture to engage the lower surface of said plate member to resist withdrawal;
said leg member turned distal end portions terminating in a rectangular central tab and adjacent shoulder portions which extend perpendicularly from each transverse side of said tab, whereby if said distal end portion is inserted sufficiently the tab underlies the lower surface of the plate member and a shoulder may underlie said lower surface when it is not possible to extend said tab portion wholly beyond said lower surface; and
a spring arm attached to said body portion along the margin thereof at one longitudinal end, formed of the material of said body portion and turned back to underlie said body portion between said leg members and compressively retain a cable disposed between said body portion and said plate member.

3,989,211

COLUMN DRAWING TABLE

Arnold Gundlach, Wilhelmshaven, Germany, assignor to Franz Kuhlmann KG, Germany

Filed Dec. 4, 1975, Ser. No. 637,645
Claims priority, application Germany, Dec. 30, 1974, 2461830
Int. Cl.² F16M *11/00*
U.S. Cl. 248—162 **8 Claims**



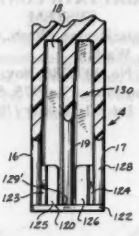
1. A vertically adjustable pedestal drawing table comprising:
a pedestal;
a pedestal column;
a pedestal foot secured to said pedestal, said pedestal column being vertically movable with respect to said pedestal foot and said pedestal;
roller means secured to the walls of said pedestal for guiding said pedestal column in vertical movement;
interior lugs vertically arranged on the inside walls of said column;
a gas spring, one end of which is supported by said pedestal, said gas spring effectively providing weight balance for said drawing table and generally comprising a piston and a cylinder;
a releasable transverse bracket mounted to said pedestal column, the other end of said gas spring being positioned and supported by said releasable bracket;
frame means at least partially surrounding said pedestal column and being pivotally connected to said pedestal to releasably hold said pedestal column at any desired position with respect to said pedestal; and
a drop brake comprising:
a flap pivotably mounted with respect to said pedestal column; and
clamping means coupled to said flap for engaging surfaces which remain stationary with respect to said pedestal to arrest sudden downward movement of said pedestal column with respect to said pedestal and said pedestal foot.

3,989,212

CHAIR AND SUPPORTING BASE FOR A SEAT

Roy E. Jennings, Temple, Tex., assignor to Royal Seating Corporation, Cameron, Tex.

Continuation of Ser. No. 268,808, July 3, 1972, abandoned, which is a continuation-in-part of Ser. Nos. 198,175, Nov. 12, 1971, and Ser. No. 235,673, March 17, 1972. This application Dec. 9, 1974, Ser. No. 530,946
Int. Cl.² A47B *91/06*
U.S. Cl. 248—188.9 **2 Claims**



1. A supporting leg and floor engaging glide arrangement comprising, in combination:
a unitary plastic material leg comprising
a side wall structure generally of U-shape having an open side, and
an end edge generally transverse to the side wall structure and parallel to the floor engaged by the glide; and
a rigid unitary plastic material glide comprising
a base portion of essentially uniform thickness having a bottom face adapted to rest on the floor;
a hollow side wall structure projecting upwardly from said base portion and of a dimension to fit the end of the supporting leg;
said base having a top face parallel to the bottom face and being continuous across and engaging the end edge of the leg;
said side wall structure of said glide having flat surfaces parallel with and engaging surfaces of the side wall structure of the leg adjacent the end of the leg on which the glide is mounted, and the end edge engaging the top face of the base;
the side wall structure of the leg to which the glide is attached includes
first and second spaced apart side walls, and
a connecting wall extending between and joining said first and second walls,
said first and second walls defining the open side of the leg between exposed side edges thereof;

said side wall structure of said glide includes

a first wall projecting upwardly from said base portion, and

a second wall projecting upwardly from said base portion in spaced relation to said first wall;

said first and second walls of said glide have exterior surfaces engaging the inside surfaces of said first and second walls of said leg at a location adjacent the end of said leg; and

bonding means for bonding surfaces of the glide side wall to the leg side wall and including a weld through said first and second walls of said glide and leg.

3,989,213

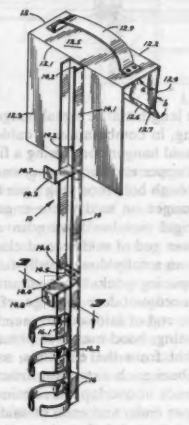
PORTABLE BRACKET FOR ELECTRONIC TRANSDUCER

Dilman F. Allen, Boy River, Minn. 56632

Filed Aug. 15, 1975, Ser. No. 604,949

Int. Cl.² E04G *3/00*

U.S. Cl. 248—214 7 Claims



1. A portable easily installed and removed mounting bracket mounting an electronic transducer to the transom of a boat, comprising

a transom connector comprising a springy metal sheet having parallel bends thereacross providing the sheet with a generally inverted U cross section, the legs of the U defining opposed, spaced, downwardly converging, front and rear legs spring-pressed inwardly toward one another, the legs being spreadable against spring pressure into positions approaching parallelism for lowering the connector onto the transom of a boat with the front and rear legs pressing inwardly upon front and rear opposed walls of the transom and the cross member of the U providing a plate resting on the upper surface of the boat transom;

a rigid, upright mounting post rigidly attached at its upper end to the rear leg of the transom connector and having a lower end extending downwardly below the transom connector; and

a transducer clamp rigidly mounted to the lower end of the mounting post and having springy, opposed arms clamping between them an electronic transducer in operating position below the bottom of the boat; the bracket being free of articulations, and the spreadable legs of the transom connector at least partially absorbing shock when the lower end of the mounting bracket is struck rearwardly upon encounter with submerged objects or the like.

3,989,214

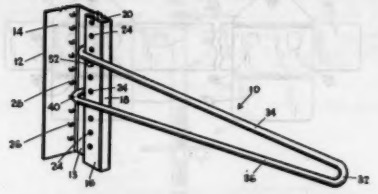
WALL BRACKET ASSEMBLY

Donald J. Behnk, 2341 Sample Road, Allison Park, Pa. 15101

Filed Nov. 14, 1975, Ser. No. 631,878

Int. Cl.² F16M *13/00*

U.S. Cl. 248—223 7 Claims



1. A wall bracket assembly comprising

an upright support having a back section, a first side section extending outwardly from one side of said back section, a second side section spaced from said first side section to define a channel therebetween and extending inwardly from the outer end of said first side section to an inner end position disposed at a point intermediate the ends of said first side section, and an outer wall joining the outer ends of said first and second side sections;

enlargement means on one of said side sections arranged within said channel;

a plurality of longitudinally spaced abutments on said back section;

a load supporting bracket extending laterally from said support;

securing means on the inner end section of said bracket for engaging an upper portion of at least one of said abutments when said bracket is in the load supporting position with said support;

said inner end section of said bracket having at least a portion thereof received within said channel with an upper portion of said inner end section shaped to engage said outer wall and an intermediate section shaped to engage said enlargement means to snugly secure a major portion of said inner end section within said channel when said bracket is in its load supporting position, with said inner end section, said channel, and said securing means being so constructed and arranged that when said bracket is pivoted upwardly said intermediate section disengages from said enlargement means and said securing means disengages from said abutment permitting downward and upward positioning of said bracket with respect to said support.

3,989,215

MEANS FOR FIXING ARTICLES OF WALL FURNITURE TO WALLS

Peter William Weston, 19 Wilmington Close, Hassocks, Sussex, England

Filed Jan. 2, 1976, Ser. No. 646,392

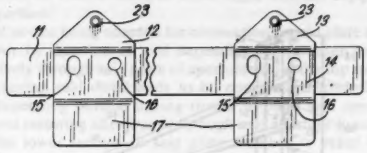
Claims priority, application United Kingdom, Jan. 7, 1975, 591/75

Int. Cl.² F16M *13/00*

U.S. Cl. 248—224 5 Claims

1. Means for mounting an article of wall furniture comprising a wall mounting member in the form of a bar having mounting lugs fixed to it at or near its ends to lie against a wall, a vertical slot passing through each lug and the bar by which the lugs and bar may be fixed to the wall, an upper part of each lug being bent outwardly so that it stands away from the wall and being provided with a set screw, and two mounting members for the article each comprising a bracket formed to an inverted U-shape and having means for fixing it to the article, the length of the set screw being such that it will just fit be-

tween the arms of the U-shape, the mounting of the article being carried out by placing the members over the lugs so that



the arms of the U-shape engage the ends of the set screw, the top of the article being adjustable towards and away from the wall by altering the position of the set screw.

3,989,216

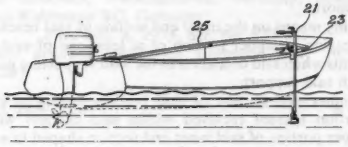
TRANSDUCER MOUNTING BRACKET

Don W. Veatch, P.O. Box 207, Longview, Tex. 75601

Filed Oct. 16, 1975, Ser. No. 623,090

Int. Cl.² H04B *13/00*

U.S. Cl. 248—278 **8 Claims**



1. A bracket for mounting an acoustic transducer to a boat or the like, comprising:

shaft means,

means for coupling said shaft means to a boat or the like with the shaft means located with its lower end in the water, said means for coupling said shaft means to said boat including structure for allowing universal pivotal movement of said shaft such that substantially vertical positioning of said shaft can be effected regardless of the attitude of said boat and such that reflections of acoustic energy from said acoustic transducer can be interpreted correctly;

a transducer support mount pivotally coupled to the lower end of said shaft means for pivotal movement about an axis transverse to the longitudinal axis of said shaft means,

means for rotating said shaft means about its said longitudinal axis, and

means for pivoting said mount and hence a transducer when supported by said mount between first and second angular positions,

said mount when in said first angular position allowing the transducer to transmit and receive signals generally in the direction of the axis of said shaft means for measuring distance vertically to a reflecting object, as for measuring water depth,

said mount in second position allowing the transducer to transmit and receive signals in a direction generally transverse to the longitudinal axis of said shaft means.

3,989,217

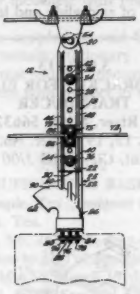
ADJUSTABLE WIRE ENTRANCE HANGER FOR A TRAFFIC SIGNAL

Jack J. Friedman, 1025 SE. 5th St., Hialeah, Fla. 33010

Continuation-in-part of Ser. No. 493,021, July 30, 1974, Pat. No. 3,916,265. This application Jan. 23, 1975, Ser. No. 543,316

Int. Cl.² B42F *13/00*

U.S. Cl. 248—327 **4 Claims**



1. An adjustable length traffic signal hanger for suspension on a cable including, in combination, a cable engaging member and a hanger, said hanger comprising a first elongate rigid member having an upper end and a lower end, said upper end having a lateral through hole receiving a pin therethrough and suspending said hanger on said cable engaging member, a second elongate rigid member having an upper end and a lower end, said lower end of said second elongate rigid member terminating in an axially downwardly facing opening and including a side opening pocket in communication with the axial opening to accommodate passage of electrical leads, means on the lower end of said second member to connect to a traffic signal housing, hood means to protectively cover the side opening pocket from the elements, said first and said second rigid members each extending from their respective upper and lower ends in overlapped relation of their respective lower and upper ends, and each of said members having a plurality of equi-spaced holes along the length thereof adapted to register in aligned relation on sliding movement of the members to extend or contract the overall hanger length between the lateral through hole and the housing, means to keep the first and second members in a selected position of adjusted length, and clamp means being provided on said hanger intermediate said axially downwardly facing opening and said lateral through hole to connect to a stabilizes cable and means to connect said clamp means to said hanger at selected locations along the length thereof, said clamp means including a through opening with a centerline perpendicular to said lateral through hole and the longitudinal axis of said hanger, said through opening being adapted to receive a stabilizer cable to limit movement in response to sway forces.

3,989,218

CANTILEVER FORM USED IN BRIDGE CONSTRUCTION

Jean M. Muller, Suresnes, France, assignor to Societe d'Etudes de Genie Civil et de Techniques Industrielles (GE.C.T.I.), Paris, France

Continuation of Ser. No. 380,106, July 17, 1973, abandoned. This application May 1, 1975, Ser. No. 573,794

The portion of the term of this patent subsequent to Aug. 5, 1992, has been disclaimed.

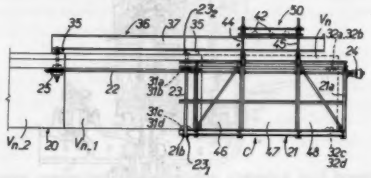
Int. Cl.² E01D *1/00*; E04G *9/00*

U.S. Cl. 249—20 **3 Claims**

1. In combination with a bridge or similar elevated elongated civil engineering work under construction, a cantilever

type installation for successively in situ concreting a plurality of substantially horizontally extending, longitudinally consecutive concrete sections (V_1, V_2, V_3 . . . V_{n-1}, V_n, . . .) of said work, said installation comprising:

a mold-carrying rigid structural frame overhanging in longitudinal prolongation of the last concreted section (V_{n-1}) of an already completed portion of the work at the place where a new section (V_n) of the work is to be concreted, said frame presenting a first end-region which is proximal with respect to the already completed portion of the work and which overlaps the last concreted section (V_{n-1}), and a second end-region which is longitudinally spaced therefrom; and means fixed to said proximal end-region of said rigid structural frame for abutting said frame against already completed portion of said work in a longitudinal direction towards the completed portion; wherein the improvement comprises:



means for securing said rigid structural frame to said already completed portion of said work allowing the load resulting from the weight of said frame and of said new section (V_n) to be transferred to the already completed portion of the work, said securing means comprising: at least one main double ended prestressing member extending longitudinally of said work and anchored by one of its ends to said second end-region of said rigid frame and by its other end to said already-completed portion of said work, said main prestressing member being tensioned to press said rigid frame in said longitudinal direction via said abutment means against said already completed portion of said work; and

at least one auxiliary double ended prestressing member which extends substantially vertically to said work and is anchored by one of its ends to said overlapping proximal end-region of the rigid frame and by its other end to said last section (V_{n-1}) of said completed portion of said work, said auxiliary prestressing member also being tensioned.

3,989,219

ADJUSTABLE MEANS CONNECTING A DECK MEMBER TO A SUPPORT

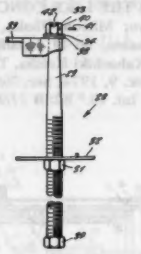
Vernon E. Pruett, Rte. No. 2, Box 1, Worthington, Ind. 47471

Continuation-in-part of Ser. No. 403,282, Oct. 3, 1973, abandoned. This application Dec. 6, 1974, Ser. No. 530,063

Int. Cl.² E01D *21/02*

U.S. Cl. 249—24 **11 Claims**

1. For use in establishing the prescribed elevational difference between an adjustably movable deck member and a relatively stationary support member, a plurality of bolt assemblies suspending said deck member beneath such support member for providing vertical adjustment of said deck member with respect to said support member, each of said bolt assemblies comprising a vertically extending bolt having an upper end portion, lower end portion and intermediate portion, a hanger mounted on said support member, said upper end portion of said bolt penetrating through said hanger, said bolt being rotatable relative to said hanger, said upper end portion being threaded, a first nut threadedly engaging said upper end portion and restraining said bolt against movement downwardly relative to said hanger, said intermediate portion comprising a threaded portion, a second nut threadedly engaging said intermediate portion and supporting said deck member, means engaging said deck member and said second nut for preventing said second nut from rotating relative to said deck member when said bolt is rotated such that rotation



of said bolt moves said deck member vertically, and means providing cooperating recesses on said upper end portion and said first nut, said recesses being selectively engageable by means to allow said upper end portion and said first nut to be rotated together during said vertical adjustment.

3,989,220

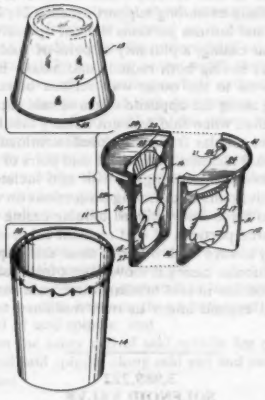
SHAKER MOLDING ASSEMBLY

Allen A. Greenberg, 3531 N. 47th Ave., Hollywood, Fla. 33021

Division of Ser. No. 164,740, July 21, 1971, Pat. No. 3,958,997. This application Dec. 1, 1975, Ser. No. 636,662

Int. Cl.² B22C *9/22*; **B29C** *1/16*

U.S. Cl. 249—105 **5 Claims**



1. A shaker molding assembly which comprises a pair of mold halves, each of said mold halves including a mold cavity, a flat face extending outwardly from sides and one end of the mold cavity, and an end face plate having an end face extending outwardly from the other end of the mold cavity, the mold cavity being open at said other end, a mold holder having a frusto-conic wall receiving the mold halves, an outwardly extending wedge-shaped rib on each mold engaging the frusto-conic wall to drive the mold halves together with the flat faces thereof in flatwise engagement, an axially extending rib on each mold half on the outer edge of the end face thereof, and a measuring cup having an outwardly extending flange at a mouth thereof, there being slots on inner faces of the axially extending ribs receiving portions of the flange of the measuring cup, the measuring cup being sealed to the mold halves

when the measuring cup and the holder are urged together and the contents of the assembly are shaken.

3,989,221

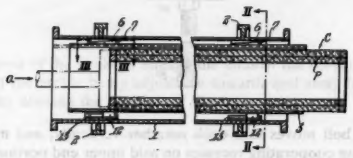
FORM STRUCTURE FOR USE IN THE MAKING OF COLUMNAR OR THE LIKE CONCRETE PRODUCTS

Senri Okada, Tokyo; Mitsuo Ohoka, Ohtone, and Shinzo Hasegawa, Yokohama, all of Japan, assignors to Nippon Concrete Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1974, Ser. No. 530,766

Int. Cl.² B28B *21/82*

U.S. Cl. 249—173 **4 Claims**



1. A form structure for use in the making of columnar or the like concrete products, comprising: a tubular frame (1) adapted to be driven to rotate about its own axis, a plurality of pairs of opposed camming projections (7) having both radially and axially inclined flat surfaces operatively secured to the wall surface of said tubular frame and projecting inwardly therefrom at axially spaced intervals in axially aligned relation to each other, and a resilient unitary tubular casing (3) having a gap (4) in its wall extending longitudinally the length thereof, fixedly carried by said tubular frame, and being axially inserted in said tubular frame substantially coaxially therewith, radially extending support means (21, 24) on said frame at side and bottom portions thereof operatively engaging said tubular casing; a plurality of pairs of guide camming projections (6) having both radially and axially inclined flat surfaces, secured to the outer wall surface of said resilient tubular casing along the opposite edges of said gap in such an arrangement that, when said resilient unitary tubular casing is inserted in said tubular frame to a predetermined axial position therein, said inclined surfaces of said pairs of guide camming projections will interengage with said inclined surfaces of said respective pairs of camming projections on said tubular frame so as to force said resilient tubular casing radially inwardly and force portions of said resilient tubular casing circumferentially toward each other to close said gap and, when said resilient tubular casing is moved back from said predetermined axial position in said tubular frame, said resilient tubular casing will expand under its own resiliency to open said gap.

3,989,222

SOLENOID VALVE

Fumiya Yoshiyasu, 4-51 Nishiuchie-cho, Nishi, Nagoya, Aichi, Japan

Filed July 28, 1975, Ser. No. 599,923

Int. Cl.² F16K *31/06*

U.S. Cl. 251—30 **5 Claims**

1. A power operated valve comprising:

a. a valve body (10) having an inlet chamber (13) and an outlet chamber (14) with a main valve seat (15) therebetween, said main valve seat (15) having a passageway therein;

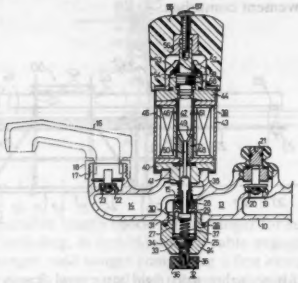
b. a cylinder member (24) removably mounted on the lower surface of the valve body having a cylinder chamber (25) opened to the interior of the inlet chamber;

c. a main valve element (26) movably positioned in the cylinder chamber for selectively communicating the inlet chamber (13) with the outlet chamber (14) through said passageway in the main valve seat (15), a subsidiary valve seat (29) positioned on the same axis as of the main valve seat, said subsidiary valve seat having a passageway therein;

d. a limit member (34) adjustably disposed in the cylinder chamber for limiting the movement of the main valve element within a desired movement quantity range;

e. a subsidiary valve element (30) movably disposed below the subsidiary valve seat (29) for selectively communicating the cylinder chamber with the outlet chamber through said passageway in the subsidiary valve seat;

f. spring means (37) disposed between the subsidiary valve element and the limit member (34) to urge the main and subsidiary valve elements to normally closed positions;



g. an actuator rod (41) extending from the subsidiary valve element (30) through the passageways to move the subsidiary valve element to the opened position;

h. a solenoid structure (39) removably mounted on the upper surface of the valve body for reciprocating the actuator rod having a plunger (47) positioned on the same axis as of the actuator rod (41) to be detachably connected with it; and,

i. a manually operated knob (55) removably mounted on the solenoid structure (39) for reciprocating the actuator rod (41) having a knob shaft positioned on the same axis as of the plunger (47) to be detachably connected with it, said main valve element having a piston portion adapted to be inserted in the cylinder chamber, whereby the main valve element is slowly moved from the opened position to the closed position.

3,989,223

ROTARY MOTION FAILSAFE GATE VALVE ACTUATOR

Joseph A. Burkhardt, New Orleans; Thomas W. Childers, Mandeville, both of La., and Roger J. Koerner, Fountain Valley, Calif., assignors to Exxon Production Research Company, Houston, Tex.

Filed Dec. 28, 1973, Ser. No. 429,434

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² F16K *31/12*

U.S. Cl. 251—58 **19 Claims**

1. A valve actuator for a valve comprising:

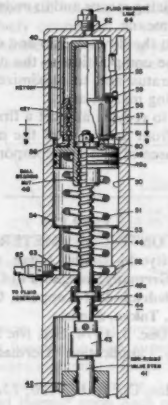
a housing having a fluid pressure inlet, a fluid pressure exhaust, and an inner sealing shoulder;

a rotatable screw shaft arranged in said housing connectable at one end to said valve;

a ball bearing nut mounted on the other end of said shaft and forming a piston longitudinally movable in said housing from a first to a second position;

biasing means surrounding said screw shaft engaging said piston and urging said piston to said first position thereof; said piston containing peripheral seals for sealing engagement with the inner wall of said housing; said piston

sealingly engaging said inner sealing shoulder of said housing when said piston is in said second position thereof; and



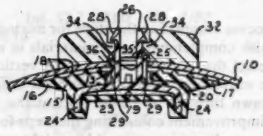
means connected to said piston engaging said housing to prevent rotation of said piston.

3,989,224

SLIDING GATE ASSEMBLY FOR IRRIGATION PIPES

Gerald H. Kroeker, Henderson, Nebr., assignor to Epkro Plastics, Inc., Henderson, Nebr.

Filed July 14, 1975, Ser. No. 595,710
Int. Cl.² F16K 3/28
U.S. Cl. 251—145 6 Claims



1. A gate assembly for controlling fluid flow through an opening formed in the wall of an irrigation pipe, said gate assembly comprising:

a flexible closure member positioned adjacent said opening against the interior surface of said pipe for sliding movement between an open position and a closed position to respectively permit and prevent flow through said opening;

a slide member overlying said opening on the exterior of said pipe, said slide member including a pair of abutment surfaces spaced apart from one another and oriented to face generally away from said closure member; and

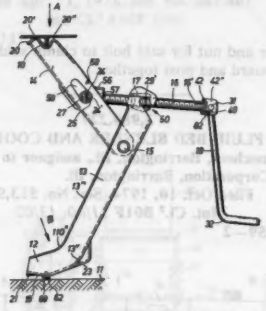
a carrier member connected to said closure member to effect movement of the latter, said carrier member including a pair of resilient lugs spaced apart from one another with the resiliency of said lugs permitting them to be displaced laterally relative to one another, said lugs extending outwardly through said opening and presenting shoulders oriented to face generally toward said closure member, said shoulders overlying the respective abutment surfaces in engagement therewith to connect said closure, carrier and slide members together for movement in unison.

3,989,225

VEHICLE LIFTING JACK

Friedrich Keilholz, Ennepetal, Germany, assignor to Firma August Bilstein, Ennepetal, Germany

Filed June 6, 1975, Ser. No. 584,419
Claims priority, application Germany, June 7, 1974, 24274439; Aug. 12, 1974, 24386434; Mar. 10, 1975, 7507439[U]
Int. Cl.² B66F 3/12
U.S. Cl. 254—126 10 Claims



1. A vehicle jack comprising:

a leg formed with a straight shank having an upper end, a foot angled from and formed on a lower end of said shanks, a nonslip rib on the underside of said foot extending substantially over the entire width thereof, said foot having an extended locating surface extending forwardly of said rib and provided with projections, and a contact surface rearwardly of said rib, the upper end of said leg being formed with a notch;

an elongated carrier arm having one end pivotally connected to said shank and another end another end formed with a vehicle-engaging head;

a nut pivotally mounted in said notch at said upper end of said leg;

a thread elongated spindle received in said nut at an intermediate portion along its length;

a thrust bearing pivotally mounted on said arm at an intermediate location between the ends thereof and engaging one end of said spindle; and

a crank on the other end of said spindle for rotating same to thread said spindle along said nut and raise and lower said head.

3,989,226

POST-MOUNTED FENCE BOARD SUPPORT BRACKETS

Allen L. Burgess, 711 Emerson St. NE., Washington, D.C. 20017

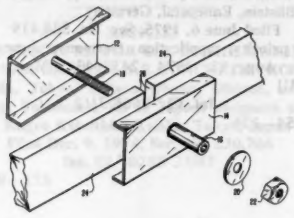
Filed Sept. 8, 1975, Ser. No. 611,014
Int. Cl.² E04H 17/14
U.S. Cl. 256—65 3 Claims

1. A bracket assembly for mounting boards on fence posts, comprising

a pair of opposed channel bracket plates adapted for holdng a board therebetween,

a sleeve extending from the back of one of said plates adapted for mounting in a corresponding bore extending through a fence post,

a bolt extending from the inside of the other plate through said sleeve, and



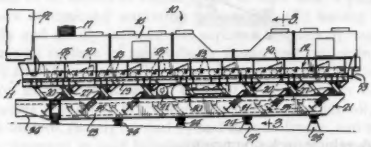
a washer and nut for said bolt to clamp said assembly and said board and post together.

3,989,227

FLUID BED BLENDER AND COOLER

Albert Musschoot, Barrington, Ill., assignor to General Kinematics Corporation, Barrington, Ill.

Filed Oct. 10, 1974, Ser. No. 513,931
Int. Cl.² B01F *11/00, 13/02*
U.S. Cl. 259—2 5 Claims



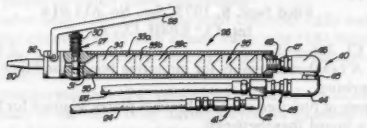
1. A fluid bed blender comprising a horizontally arranged, longitudinally extending, material-carrying member having a bottom for supporting pulverulent material thereon, said bottom including a plurality of overlapping plates spaced apart at the area of overlap, means supporting the material-carrying member for vibratory conveying motion, a plenum chamber carried by the material-carrying member below the bottom thereof, means for introducing fluid into the plenum chamber for passage upwardly through the spaces separating the overlapping plates to provide a flow of fluid through the material carried by said bottom and to aid in moving said material horizontally along said member, means carried by the member providing a blending of material being carried on the bottom thereof, and means for imparting vibratory conveying movement to said material-carrying member.

3,989,228

MIXING AND DISPENSING APPARATUS

Lester Morris, Encino, and Dennis Perkins, Gardena, both of Calif., assignors to Products Research & Chemical Corporation, Burbank, Calif.

Continuation of Ser. No. 443,300, Dec. 19, 1974, abandoned.
This application Aug. 26, 1975, Ser. No. 607,754
Int. Cl.² B01F *15/00, 5/12*
U.S. Cl. 259—4 AC 17 Claims



2. A device for dispensing a multi-component composition including:

a. a mixing means for mixing the multiple components of the composition together,

b. pressurized supply means to supply the separate components from separate sources to the upstream end of the mixing means at an elevated pressure to force material through the mixing means and to maintain a high pressure in the mixing means,

c. valve means at the downstream end of the mixing means to dispense the composition to the desired location outside the apparatus and to maximize the pressure drop over said mixing means, and

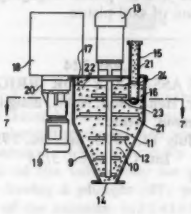
d. purge means to recycle at least a first component of the composition from upstream of the mixing means to the respective source of said first component of the composition.

3,989,229

PROCESS FOR CONTINUOUS METERING AND MIXING

Haruo Noguchi, Hiyoshi-Hights, Japan, and Max Reinhard, Bad Homburg, Germany, assignors to Colortronic Reinhard & Co. K.G., Friedrichsdorf-Koppern, Germany and Colortronic Co., Ltd., Tokyo, Japan

Filed Dec. 3, 1974, Ser. No. 529,064
Claims priority, application Germany, Dec. 5, 1973, 2360644
Int. Cl.² B01F *7/20, 15/02*
U.S. Cl. 259—8 2 Claims



1. In a process comprising the steps for mixing synthetic raw materials with complemental raw materials in a fixed ratio in a mixing vessel that extends substantially vertically such that the mixture moves downwardly by its own weight at the rate it is withdrawn through an outlet port at the bottom of the vessel, the improvement comprising the steps for continuously feeding the vessel a major amount by weight synthetic materials under the pressure of their own weight through a feed conduit opening to the vessel below the top of the vessel, said feed conduit having an opening disposed such that it assumes an angle of impingement relative to the line of flow whereby the vessel will not accept synthetic material from the feed conduit when the vessel already contains a mixture at or exceeding the height of the feed conduit opening, and feeding a major amount by weight complemental raw material to the vessel above the level of the mixture therein in metered amounts proportional to the mass flow rate of the material withdrawn from the vessel.

3,989,230

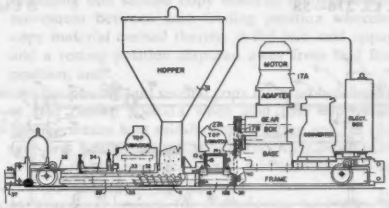
SLAB EXTRUDING MACHINE

Ernst Martens, Winnipeg, Canada, assignor to Spiroll Corporation Ltd., Winnipeg, Canada

Filed Jan. 28, 1975, Ser. No. 544,815
Claims priority, application United Kingdom, Jan. 29, 1974, 04038/74
Int. Cl.² B28C *1/00, 5/18;* A01J *21/00*
U.S. Cl. 259—161 14 Claims

1. In a slab extrusion machine which includes a longitudinally extending main frame having a pair of spaced and parallel side frame members and a plurality of spaced and parallel

auger assemblies situated between said side frame members and extending parallel thereto; means to mount said auger assemblies between said side frame members, said means including a transversely situated bearing housing, means supporting said auger assemblies by one end thereof in side by side relationship within said bearing housing, vibration generating means operatively connected to said bearing housing, and resilient mounting means supporting said bearing housing between said side frame members whereby vibration generated by said vibration generating means, is transmitted through said bearing housing to said auger assemblies, said resilient mounting means including a longitudinally extending sleeve at each end of said bearing housing, a stationary spindle supported by one end thereof upon each of said side frame members and extending through said sleeves substantially parallel to said side frame members, resilient bushings mounting said sleeves one upon each of said spindles, and vertical adjustment means supporting the other end of said spindles upon said side frame members.



3,989,231

HEAT TREATMENT OF STEEL

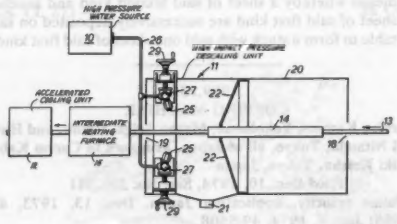
Keith Randerson, Middlesbrough, England, assignor to British Steel Corporation, London, England

Division of Ser. No. 339,309, March 8, 1973, Pat. No. 3,928,090. This application Mar. 10, 1975, Ser. No. 557,042

Claims priority, application United Kingdom, Mar. 9, 1972, 11087/72

Int. Cl.² C21D *1/62, 1/82*

U.S. Cl. 266—114 **5 Claims**



1. Apparatus for improving the cooling rate of a hot steel body having surface scale and subjected to accelerated cooling from a temperature above its change point to a lower temperature through transformation, comprising: in combination, means for subjecting said body to said accelerated cooling; a descaling unit substantially immediately ahead of said accelerated cooling means for descaling without reducing the temperature of the entire body below transition temperature; high pressure water supply means; nozzle means in said descaling unit connected to said high pressure water supply means; means for effecting relative movement between said steel body, at a temperature of at least red heat, and said nozzle means and for subsequently moving said body while still hot into said accelerated cooling means before substantial growth of new scale can occur; the high pressure water supply means, nozzle openings and angle of set of the nozzle means relative to the surface of the hot steel body and distance between the nozzle means and the body being correlated to provide a descaling impact pressure of at least 2.5 kg/cm² at the surface of said body, to thereby effectively remove scale from the surface of said body and increase the rate of heat transfer in the accelerated cooling unit.

3,989,232

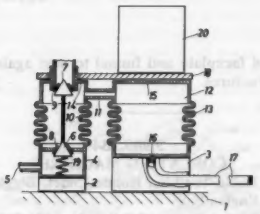
AIR DAMPED SEATING FOR DEVICES AND VEHICLES

Manfred Steinbach, and Karl-Heinz Wesslau, both of Jena, Germany, assignors to Jenoptik Jena G.m.b.H., Jena, Germany

Filed Apr. 11, 1975, Ser. No. 567,401

Int. Cl.² F16F *5/00*

U.S. Cl. 267—117 **1 Claim**



1. An air damped seating particularly for devices and vehicles comprising

a control chamber including an air inlet flange, a valve and an air outlet opening

the volume of said chamber being variable,

an air chamber having an air inlet opening and an air outlet flange,

the volume of said air chamber being variable,

a connection pipe being arranged between said air outlet opening and said air inlet opening,

and a damping duct being connected with one end portion to said air outlet flange, the other end portion being sealed,

the length of said damping duct being at least 10^3 times the diameter thereof,

the volume of said damping duct being at least one tenth of the volume of said air chamber.

3,989,233

CATHODE RAY TUBE ASSEMBLY FIXTURE

Myron Henry Wardell, Jr., Lititz, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,986

Int. Cl.² B23Q *3/00*

U.S. Cl. 269—296 **8 Claims**

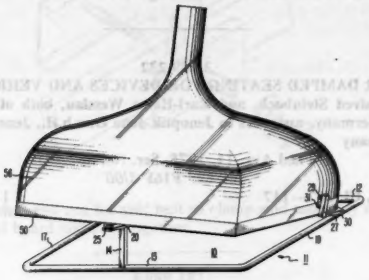
1. A fixture for supporting and aligning the faceplate and funnel on the rectangular cathode ray tube during fabrication, the faceplate having a face and four sidewalls, the fixture comprising:

a base;

means for supporting the faceplate and funnel in an abutting face down relationship and tilted at an angle with respect

to the base; and

three alignment structures positioned so that gravity causes



the tilted faceplate and funnel to nest against the alignment structures.

3,989,234

COLLATING MACHINES

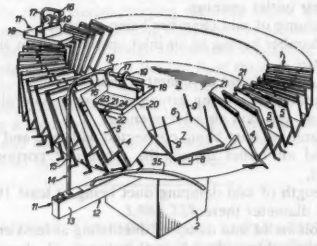
Christopher Robin Watkiss, Holme Court, Biggleswade, Bedfordshire, England

Filed July 9, 1974, Ser. No. 486,799

Claims priority, application United Kingdom, July 10, 1973, 32757/73

Int. Cl.² B65H *39/045*

U.S. Cl. 270—58 **15 Claims**



1. A collating machine comprising:

a plurality of bins located in series on an arc of a circle and each arranged to hold a stack of sheets;

a sheet collecting device adjacent to said bins;

drive means arranged to effect relative rotary movement between said plurality of bins and said collecting device;

frictional sheet feeding means co-acting with the sheets of said bins for causing single sheets of individual ones of said bins to be collected progressively in a stack at said collecting device to form a collated set as said relative rotary movement occurs; and

receiver means positioned along said arc in between two successive bins, said receiver means for receiving collated sets of sheets from said sheet collecting device.

3,989,235

METHOD OF AND MEANS FOR SANDWICHING A CENTRAL LAYER AND TWO OUTER LAYERS PREPARATORILY TO LAMINATION

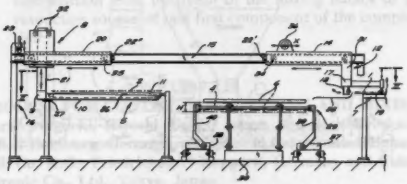
Walter Hüsges, Niederkruchten, Germany, assignor to G. Siempelkamp & Co., Krefeld, Germany

Filed Mar. 10, 1975, Ser. No. 556,967

Claims priority, application Germany, Mar. 9, 1974, 2411300

Int. Cl.² B65H *39/055*

U.S. Cl. 270—58 **8 Claims**



1. An apparatus for forming a succession of stacks each consisting of two sheets of a first kind and one sheet of a second kind sandwiched therebetween, comprising:

a stacking table;

a first and a second repository for sheets of the first and the second kind, respectively, on opposite sides of said table;

first and second sheet transporters each independently reciprocable between a loading position adjacent said first and said second repository, respectively, and an unloading position, said first and second sheet transporters being provided with first and second pickup means for engaging a sheet of said first and said second kind, respectively, and depositing the engaged sheet on said table;

drive means for reciprocating said first sheet transporter; and

intermittently operative link means programmed to interconnect said sheet transporters for entrainment of said second sheet transporter by said first sheet transporter, upon deposition of one sheet of said first kind on said table, and to disconnect said sheet transporters from each other after a single joint reciprocation by said drive means whereby a sheet of said second kind and another sheet of said first kind are successively deposited on said table to form a stack with said one sheet of said first kind.

3,989,236

COPYING MACHINE

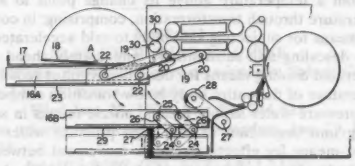
Shigehiro Komori, Yokohama; Masao Ariga, Chofu, and Hiroshi Nitanda, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 10, 1974, Ser. No. 531,381

Claims priority, application Japan, Dec. 13, 1973, 48-140955; Jan. 8, 1974, 49-5508

Int. Cl.² B65H *3/44, 1/12*

U.S. Cl. 271—4 **9 Claims**



1. A copying apparatus comprising:

copy processing means for reproducing an image of an original on a copy material;

first copy material holding means for carrying the copy material to be fed into said copy processing means, means mounting said first copy material holding means for movement between a feeding position wherein the copy material carried thereby is fed into said apparatus and a receiving position wherein the copy material discharged out of said copy processing means is received by the first holding means;

second copy material holding means for carrying the copy material to be fed into said copy processing means, means mounting said second copy material holding means for movement between said feeding position wherein the copy material carried thereby is fed into said apparatus and a resting position disposed away from said feeding position; and

means for placing said second copy material holding means at said resting position when said first copy material holding means is at said feeding position and for placing said first holding means at said receiving position when said second holding means is at said feeding position.

8. A copying apparatus comprising:

copy processing means for reproducing an image of an original on copy material;

first and second cassette holder means mounted on said apparatus, said second holder means being normally positioned at a feeding station;

first and second cassettes detachably mountable respectively on said first and second holder means and adapted to carry copy material to be fed into said copy processing means at said feeding station;

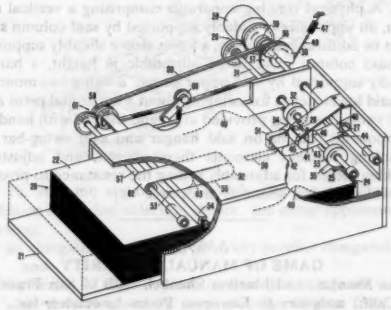
said second cassette holder means including pivotable mounting means for moving said second cassette mounted on said second holder means away from said feeding station in response to mounting said first cassette on said first holder means and for moving said second cassette back to said feeding station when said first cassette is removed from said first holder means.

3,989,237

VARIABLE FORCE SHEET FEEDING MECHANISM

Willie Goff, Jr., Lexington, Ky., and Lowell M. Simson, Lafayette, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 5, 1975, Ser. No. 574,220
Int. Cl.² B65H *3/02*, *3/54*
U.S. Cl. 271—19 **26 Claims**



1. A variable force sheet feeding mechanism operable to separate the top sheet from a stack of sheets by first moving the top sheet to the rear, to form a buckle therein as the top sheet is separated from the next sheet in the stack, and thereafter to move the top sheet forward, the improvement comprising:

variable magnitude and direction force means associated with a portion of the front of the top sheet, comprising a band spring whose relaxed position places said band spring out of contact with said top sheet, unwinding of said band spring producing said rearward sheet movement, and return of said band spring to said relaxed position producing said forward sheet movement, and

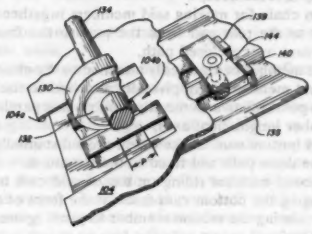
cyclically operable means controlling said force means causing said band spring to unwind and to engage said top sheet with a force profile which increases as a function of time during said unwinding, and to thereafter cause said band spring to return to said relaxed position and drive said top sheet forward, said force profile decreasing as a function of time during the return of said band spring to said relaxed position.

3,989,238

PHOTOCOPY MACHINE

James George McCarthy, Park Ridge, and Burton Greenberg, Skokie, both of Ill., assignors to OCE'-Industries Inc., Chicago, Ill.

Filed Apr. 10, 1974, Ser. No. 459,655
Int. Cl.² B65H *3/46*
U.S. Cl. 271—124 **14 Claims**



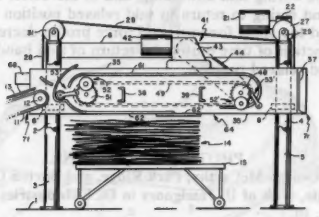
5. In a photocopy machine having means for supporting a stack of documents to be copied and means for successively withdrawing the topmost document from said stack and feeding the same along an original document transport path, the improvement wherein the document withdrawing means comprises rotatable means disposed for engagement with the upper surface leading edge region of said topmost document of said stack, means for rotating said rotatable means to effect travel of at least said topmost document past said rotatable means and toward said transport path, and means cooperable with said rotatable means for preventing travel toward said transport path of any but the topmost document beyond said rotatable means, the last-named means including means disposed in flanking relationship to said rotatable means to engage spaced apart underside length regions of the lowest traveling document and maintain said length regions in a common plane that intercepts the periphery of rotation of said rotatable means to cause traveling documents to be pinched between said rotatable means and the flanking means with successively increasing pinching forces as such documents enter the region of intercept by said plane with said periphery, said flanking means having a frictional characteristic greater than paper but less than that of said rotatable means whereby travel completely past said region of intercept is possible only for the topmost document entering the same, said common plane being inclined with respect to horizontal so as to define a descending document feed path in said region of intercept.

3,989,239

SHEET STACKING APPARATUS

Albert K. Scriven, Jr., and Michael F. Aulson, both of Beverly, Mass., assignors to Speco, Inc., Beverly, Mass.

Filed Oct. 20, 1971, Ser. No. 190,897
Int. Cl.² B65H 29/04
U.S. Cl. 271—204 2 Claims



1. Apparatus for stacking sheets on a platform comprising,
a structure positionable above the platform having front and rear ends and sides,
a first member in the structure having a longitudinal axis which extends from side to side therein,
a second member in the structure having a longitudinal axis which extends from side to side therein parallel to the axis of the first member,
a driven chain for moving said members together from the front to the rear and from the rear to the front of the structure over a closed path,
the first member being fixedly attached to the chain and the second member being pivotally attached to the chain so as to pivot relative to the chain on an axis parallel to said member longitudinal axes,
top and bottom cam tracks which are substantially parallel to the drive path and fixed to the structure,
said second member riding on top of said cam tracks and engaging the bottom cam track at the front of the structure causing the second member to pivot against the first member,
said bottom cam track extending toward the rear of the structure to a point where the second member leaves the bottom cam track and engages the top cam track,
whereby the members close at the front and separate when the second member reaches said point as both members approach the rear from the front of the structure, and
means for inserting a sheet between the members before they are closed at the front,
whereby the sheet is carried by the members to the rear and released on the platform.

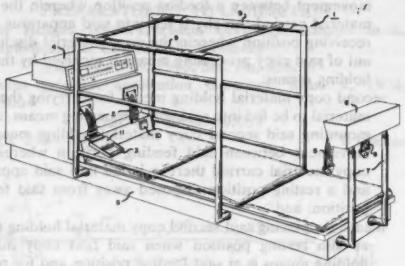
3,989,240

ELECTRICALLY TIMED EXERCISING DEVICE

Bernard J. Victor, 122 Park Place, Pittsburgh, Pa. 15237; Kenneth M. Tudoverto, 94 N. Euclid Ave., Pittsburgh, Pa. 15202, and Bernard J. Victor, Jr., 122 Park Place, Pittsburgh, Pa. 15237

Filed May 6, 1975, Ser. No. 575,088
Int. Cl.² A63B 21/24
U.S. Cl. 272—125 5 Claims

1. A power exerciser comprising:
a. a frame,
b. power means for supplying mechanical power fixably attached to said frame,
c. a plurality of straps operably attached to said power means, said straps being extendable or retractable by said power means,
d. means for activating and deactivating said power means,
e. sequencing means operably connected to said power means for providing a preselected timed sequence of instructions to the power means for limiting the lengths of extension and retraction of said straps while a user is attached to the free ends thereof; and



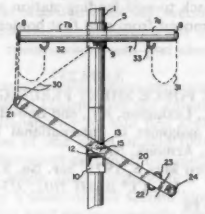
f. said sequencing means including selector means operably connected thereto for presetting said sequencing means to control said power means during an exercise program in which a user is acted upon by the exerciser.

3,989,241

PHYSICAL TRAINING APPARATUS

Andre Pierre Joseph Ourgant, 26, avenue de Predecelle, 91470 Limours, France

Filed June 13, 1975, Ser. No. 586,705
Claims priority, application France, July 29, 1974, 74.26315
Int. Cl.² A63B 21/00
U.S. Cl. 272—136 7 Claims



1. A physical training apparatus comprising a vertical column, an upper sleeve slidably supported by said column such as to be adjustable in height, a lower sleeve slidably supported by said column so as to be adjustable in height, a hanger fixedly supported by said upper sleeve, a swing-bar mounted on said lower sleeve for swinging about a horizontal pivot axis, said swing-bar being provided at an end thereof with handling components, means on said hanger and said swing-bar for attaching resilient elements therebetween, and adjustable braking means for adjustably setting the resistance to pivoting of said swing-bar about its pivot axis.

3,989,242

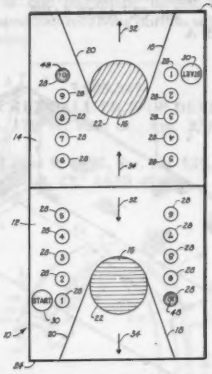
GAME OF MANUAL DEXTERITY

John Shankel, and Marilou Shankel, both of San Francisco, Calif., assignors to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 3, 1975, Ser. No. 564,599
Int. Cl.² A63F 9/00
U.S. Cl. 273—1 R 6 Claims

1. A game of manual dexterity, which comprises:
a. a playing board having two identical zones and a pair of distal ends;
b. a large circle having an outer periphery contained centrally in each said zone;

c. ten small circles numbered sequentially from one to ten contained in each said zone;
d. one medium size start circle contained in each said zone;
e. a pair of cylindrical shaped members having a pair of distal ends adapted to be held between two fingers of a player, said cylindrical shaped members transferred from



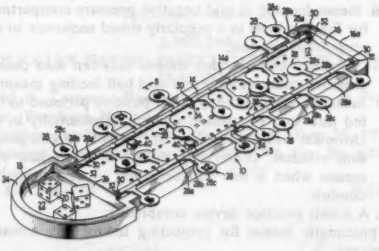
one said large circle of one said zone to the other said large circle of the other said zone;
f. a timer unit; and
g. a pair of circular disc members, one said circular disc member moved from said start circle through said small circles of each said zone.

3,989,243

REACTION GAME APPARATUS

Jeffrey D. Breslow, Highland Park, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Oct. 20, 1975, Ser. No. 623,771
Int. Cl.² A63F 9/00
U.S. Cl. 273—1 R 19 Claims



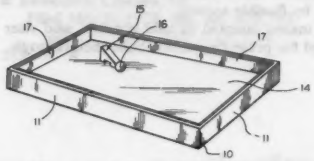
16. A game apparatus in which dice are employed as a chance numerical selection device, the game apparatus comprising:
an elongated base having generally parallel elongated sides; and
a plurality of flippers pivotally mounted along said sides for movement generally perpendicular thereto from outer positions to positions on the base generally centrally between said sides, each of said flippers along one side of the base having numerical indicating means on each side thereof identical to the numerical indicating means on the oppposite flipper on the other side of the base, the flippers being of sufficient length so as to cover the numerical indicating means of an opposing flipper when both flippers are disposed one on top of the other in said central position on the base.

3,989,244

POOL GUIDE AIMING AND TEACHING DEVICE

Donald P. Wadina, 644 S. 69th St., Milwaukee, Wis. 53214

Continuation-in-part of Ser. No. 482,418, June 24, 1974, abandoned, which is a continuation-in-part of Ser. No. 341,467, March 15, 1973, abandoned. This application Mar. 12, 1975, Ser. No. 557,620
Int. Cl.² A63D 15/00
U.S. Cl. 273—14 8 Claims



1. A portable indicating device for predetermining the direction of linear course in which a pool ball should be driven during a game of pool comprising;
miniature playing surface means for simulating the surface of a pool table;
combined direction and location indicator means movable over said miniaturized simulated playing surface means;
side wall means extending around said playing surface means;
reflector means extending along and juxtaposed onto said side walls;
said direction and indicator means being reflected from the side wall by said reflector means, and
said direction and indicator means having means greater in height than the height of said pool ball so as to enable the sighting of said direction and indicator means when viewed as an image from said reflector means, whereby the direction indicator means may be aligned to indicate the proper direction said pool ball should be driven by viewing the reflection of said direction and location indicator means on said reflector means from an object point on said surface means, and aligning said indicator means in a straight line attitude relative to its reflection.

3,989,245

TENNIS PRACTICE DEVICE HAVING PNEUMATIC BALL PROJECTOR

Paul Augustine, Jr.; Jesse Brian Fender, Jr., and Donald Laverel Hildreth, all of 900 N. Broadway, Suite 725, Santa Ana, Calif. 92701

Filed Mar. 1, 1974, Ser. No. 447,306
Int. Cl.² A63B 69/00
U.S. Cl. 273—29 A 5 Claims

1. A tennis game practice device comprising the combination of a simulated tennis court approximately 70 feet long and 30 feet wide and an air-powered tennis ball projecting machine for projecting tennis balls onto said tennis court;
a tennis net positioned transversely of said court and placed approximately 20 feet from one end of said tennis court;
crowning of said court along its longitudinal axis such that its center portion is approximately 6 inches higher than its sides;
gutters adjacent each side of said tennis court which gutters slope downward towards said one end 20 feet from said net at a grade of approximately 3¾ percent, said gutters curving near said one end 20 feet from said net so that they come together to form a generally horizontal ball return conduit at a lowermost point of said court;
enclosure means for preventing substantially all tennis balls hit by a player from leaving the court;
a wall at said end 20 feet from said net having a slot therethrough and an image of target areas impressed thereon,

said target areas simulating various points on a conventional tennis court;

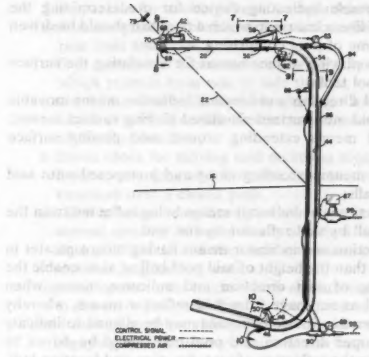
said tennis ball projecting machine having an aimable barrel extending through said slot in said wall for projecting tennis balls through said slot to selected areas of said tennis court;

said barrel having means attached thereto for selectively imparting and varying spin and speed to a projected ball;

a generally vertical riser having one of its ends coupled to said generally horizontal conduit;

said aimable barrel being coupled to the other end of said riser by flexible means;

air jet means coupled to said conduit, said riser and said barrel for projecting tennis balls therethrough;



said tennis ball projecting machine being provided with timing means whereby operations of said machine are timed for automatically delivering balls to a player at selected time intervals;

barrel elevating means for vertically adjusting said barrel;

barrel traverse means for adjusting the horizontal direction in which balls are projected;

said means coupled to said barrel for imparting vertical and horizontal spin to a projected ball;

a ball projecting machine control center coupled to said machine;

power means for transmitting power to said tennis ball projecting machine;

a motor driven ball delivery timing rotor connected to the ball projecting machine for delivering balls from said conduit to said barrel at a pre-determined rate of delivery;

an elbow having one of its ends coupled to said conduit and having its other end coupled to one end of said riser;

a riser air jet solenoid valve switch triggered by said rotor for releasing air from said jet means coupled to said conduit for propelling balls from said conduit through said elbow and into said riser; and

an elbow coupled between said riser and said barrel, one end of said barrel being coupled to one end of said elbow by said flexible means and the other end of said elbow being rotatably coupled to the other end of said riser.

3,989,246

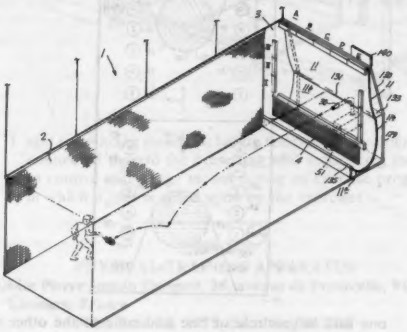
TENNIS PRACTICE SYSTEM

Alvin I. Brown, 3031 Gates Road NW., Washington, D.C. 20037; Sylvan P. Stein, 6661 Barnaby St. NW., Washington, D.C. 20015, and Eugene L. Swensen, 9605 Sunset Drive, Rockville, Md. 20850

Continuation-in-part of Ser. No. 424,911, Dec. 14, 1973, abandoned. This application Sept. 20, 1974, Ser. No. 507,853

Int. Cl.[2] A63B *61/00*

U.S. Cl. 273—29 A **34 Claims**



1. A game practice device comprising a playing area provided with a transverse barrier and a ball recovery and throwing assembly behind said barrier, said assembly comprising:

a. a backstop screen member having an impact portion extending upwardly relative to said barrier and a ball-receiving portion extending subjacent said barrier; and

b. a pneumatic ball thrower having a ball intake conduit in communication with said ball-receiving portion and a ball-propulsion conduit arranged to convey balls through said screen member and propel them forwardly over the barrier, said ball thrower further comprising:

i. a negative pressure compartment connected to said ball intake conduit;

ii. a positive pressure compartment;

iii. means located in said negative pressure compartment for feeding balls in a regularly timed sequence to said propulsion conduit;

iv. normally closed value means between said positive pressure compartment and said ball feeding means;

v. means to intermittently apply positive pressure to balls fed into said propulsion conduit substantially in synchronism with the feeding of the balls to said propulsion conduit, comprising means to open said valve means when a ball has been fed to said propulsion conduit.

29. A tennis practice device comprising:

a. pneumatic means for projecting tennis balls toward a player;

b. pneumatic means for collecting said tennis balls after being struck by said player and feeding them to said means for projecting;

c. tennis net disposed forward adjacent to said projecting and collecting means;

d. said collecting means including a ball-collecting receptacle behind the net and an upstanding screen assembly upwardly adjacent the receptacle;

e. said receptacle being provided with a bottom wall sloping toward a rear edge portion thereof;

f. inclined ramp means subjacent the rear edge of said bottom wall and leading toward said pneumatic collecting means, said ramp means being arranged to receive balls rolling past said rear edge of said receptacle bottom wall and comprising a pair of transversely extending downwardly and inwardly inclined guide ramps subjacent said

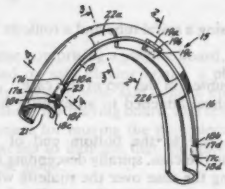
bottom wall rear edge, the inner edge of one guide ramp extending over the inner end of the other ramp and being spaced therefrom sufficiently to allow a ball rolling off the inner end of said one ramp to engage on the other ramp and continue to roll downwardly on said other ramp, and ball-receiving conduit means at the bottom end of said other ramp, said conduit means being communicatively connected to said pneumatic means, and including a channel-shaped ball-receiving portion substantially facing said other ramp.

3,989,247

RACKET BALL PICK-UP DEVICE

Eli Zimmerman, 129 W. 95th St., Apt. 2, New York, N.Y. 10025

Filed June 9, 1975, Ser. No. 585,395
Int. Cl.² A63B *49/02*
U.S. Cl. 273—73 R 10 Claims



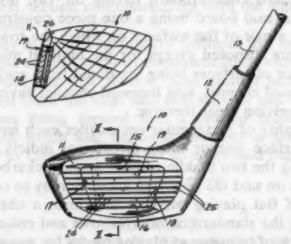
1. A racket ball pick-up device comprising in combination: support means comprising a racket head and a handle extending therefrom, for supporting a spring-biased lever structure on said racket head, and a spring means comprising said lever structure mounted on the racket head in a position adjacent and in opposing relationship to said racket head, said spring means further comprising means for permitting selective closing and opening of said lever structure whereby when said lever structure is in said open position at least a central ball wedging portion thereof is spaced from said racket head a predetermined distance slightly less than the diameter of the ball to be picked up.

3,989,248

GOLF CLUB HAVING INSERT CAPABLE OF ELASTIC FLEXING

Daniel N. Campau, Hanover Park, Ill., assignor to Pepsico, Inc., Purchase, N.Y.

Continuation-in-part of Ser. No. 536,431, Dec. 26, 1974, abandoned. This application Feb. 20, 1976, Ser. No. 659,939
Int. Cl.² A63B *53/08*
U.S. Cl. 273—78 9 Claims



1. A gold club of the wood type comprising a relatively massive enlarged head having a ball striking surface, said surface having a recess therein, and a metal insert secured within said recess and having a front grooved surface forming part of said ball striking surface, said insert having a hollow interior defining an open-ended passageway extending therethrough from top to bottom to facilitate elastic flexing of said front grooved surface.

3,989,249

GAME APPARATUS

Jeffrey D. Breslow, Highland Park, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed May 8, 1975, Ser. No. 575,792
Int. Cl.² A63F *7/06, 7/10, 7/14*
U.S. Cl. 273—87 R 9 Claims

4. A golf game apparatus, comprising:
a first set of lie cards, at least one for each player of the game, each lie card having indicia thereon representative of a different lie of the ball for the respective players after they all have taken a stroke;
a second set of playing hole cards, each hole card having indicia thereon representative of a particular hole on a golf course, including a plurality of hazards and at least one set of respective positions indicating various relative lies of the players' balls in relation to said hazards, as determined by the cards of said first set of lie cards, after all of the players have taken a stroke;
at least one hazard reference card having indicia thereon dictating the consequences of a player's stroke, as determined by his lie card, landing on a particular position relative to the hazards on the hole card, including indicia instructing a player who has encountered a hazard, as determined by chance, to change his respective lie;
a chance device for use by the players;
a playing board defining a simulated putting green for permitting the players to manually putt when their lie reaches a green on said hole card, wherein said playing board has means defining a putting surface mounted on an upstanding frame for rollingly supporting a playing ball, said putting surface including an aperture therein representative of a golf hole; and
a playing ball and miss-indicating means to determine the consequence of a player who has missed a putt, by missing said aperture.

3,989,250

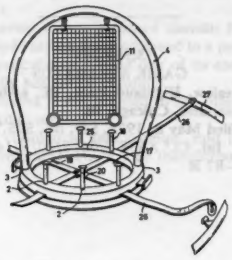
GAME APPARATUS

Thomas Ashley Lakeman, High Branches, Collington Rise, Bexhill, Sussex, England

Filed June 17, 1975, Ser. No. 587,727
Int. Cl.² A63B *71/02*
U.S. Cl. 273—102 S 10 Claims

1. A game apparatus suitable for playing with balls comprising a first base member having two opposed holes, an inverted U-shaped member releasably secured to the first base member within the two opposed holes, the first base member having a central opening therein for collecting balls in a game over

which central opening the U-shaped member extends, said first base member having a plurality of further holes spaced



around the periphery thereof and a plurality of pegs for location in said plurality of peripheral holes.

3,989,251
MAGIC GAME

Gordon A. Barlow, Skokie, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

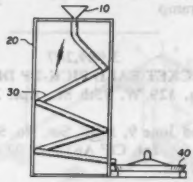
Filed Apr. 18, 1975, Ser. No. 569,168
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 AE **15 Claims**

1. A board game apparatus, comprising:
a gameboard having a playing surface thereon;
a plurality of playing pieces;
a plurality of stations on the gameboard defining a playing piece path of travel, including trick stations having indicia thereon representative of a magic trick that a player may attempt to perform should his playing piece land on that particular trick station;
a plurality of randomly operable magic trick devices corresponding to the magic tricks represented on said trick stations;
simulated money for each player of the game, said trick stations including indicia thereon which require a player to expend a predetermined amount of simulated money in order to attempt to perform one of the magic tricks by using said magic trick devices, said money being accumulated with each magic trick to be awarded to a player who first successfully performs the respective magic trick; and
means for determining how many stations a particular playing piece is to be advanced by a player along said path.

3,989,252
GAME USING A SPIRAL TUBE AND A ROULETTE WHEEL

Alvin D. Mattson, La Puente, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Aug. 11, 1975, Ser. No. 603,750
Int. Cl.² A63F *5/04*, *7/10*
U.S. Cl. 273—138 R **3 Claims**

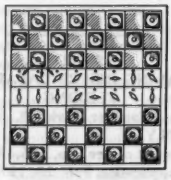


1. A game using a spiral tube and a roulette wheel, comprising:
a case,
a funnel mounted in the top of the case,
a roulette wheel attached to an exterior lower side of the case,
a tube attached to the bottom end of the funnel and mounted in the case, spirally descending through the case and leaving the case over the roulette wheel, and
a ball, whereby the ball may be spiralled from the funnel to the roulette wheel, thereby earning a point value.

3,989,253
GAME BOARD APPARATUS

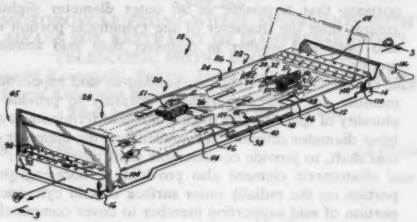
Edward J. Schifman, Nashville, Tenn., assignor to Aladdin Industries, Incorporated, Chicago, Ill.

Continuation of Ser. No. 525,389, Nov. 20, 1974, abandoned.
This application Dec. 15, 1975, Ser. No. 640,397
Int. Cl.² A63F *3/00*
U.S. Cl. 273—131 B **3 Claims**



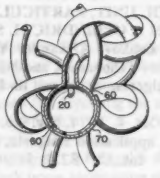
1. A game comprising:
a. a standard checkerboard having the two middle rows omitted, said board being a one piece construction and having a pair of flat surfaces on which the rows and columns are disposed except for the omitted middle rows, said pair of surfaces being separated from each other by a recessed channel, said recessed channel having discrete tile receiving areas thereon;
b. a plurality of rectangular vector tiles each having on its top surface one or more directional indicia, said tiles forming the two middle rows of said checkerboard when placed on said tile receiving areas thereby to connect the pair of flat playing surfaces and form a checkerboard having the standard number of rows and columns;
c. two sets of transparent playing pieces for movement over said playing surface, one set for each player and each set distinguishable from the other;
each vector tile controlling the subsequent direction of movement of a playing piece situated thereon, at least some of the indicia differing from tile to tile.

3,989,254
BATTLE BOARD GAME APPARATUS
Julius Cooper, New Hyde Park, N.Y., assignor to Ideal Toy Corporation, Hollis, N.Y.
Filed Oct. 9, 1975, Ser. No. 620,992
Int. Cl.² A63F *3/00*
U.S. Cl. 273—131 B 21 Claims



1. A battle game comprising a playing board, control means movably mounted on said playing board, a plurality of play pieces removably engaged with said control means for movement therewith along the playing board, and selectively operable indicating means for moving the play pieces with respect to the control means to indicate that the play piece is to be removed from the game.

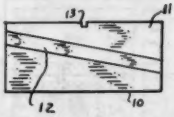
3,989,255
PUZZLE EMPLOYING MOVABLE MEMBER IN TUBULAR MAZE
Jerry Raffa, Healdsburg, Calif., assignor to The Raymond Lee Organization, Inc., a part interest
Filed Oct. 21, 1975, Ser. No. 624,540
Int. Cl.² A63F *9/08*
U.S. Cl. 273—153 R 6 Claims



1. A puzzle, comprising:
a bean-like member having a smooth outer surface;
a hollow cup;
a first section of hollow tubing with an inside diameter greater than the maximum width of the bean, one end of the first section communicating with the interior of the cup; and
a plurality of second sections of tubing of like inside diameter, said second sections communicating with each other and with the first section, said second sections being isolated from the cup, said first section and said second sections being formed into a twisted mass of tubing through which said bean-like member is slidable in an effort to cause said member to enter said cup.

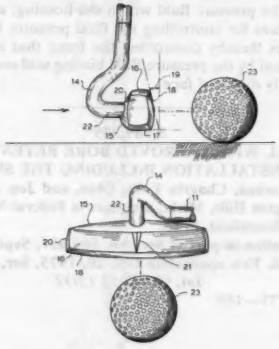
3,989,256
GOLF CLUB
Edward Cicero, 52-62 66th St., Maspeth, N.Y. 11378
Filed Apr. 6, 1971, Ser. No. 131,632
Int. Cl.² A63B *53/08*
U.S. Cl. 273—167 J 1 Claim

1. An improved golf club comprising a shaft and handle portion, a head member attached to the shaft, a substantially narrow rectilinear limited area elevated striking surface disposed on the lateral face of said head member, said lateral face being substantially planar, said striking surface being substantially planar and projecting a predetermined distance from and substantially parallel to the base of said lateral face, below the upper and above the lower horizontal boundaries of said lateral face, said striking surface extending intermediate the ends of said head member and continously diagonally across said lateral face from the toe end to the heel end of said



head member and having a central portion located at a vertical distance above the lower horizontal boundary of said head member equivalent to the center of gravity of a conventional golf ball and having the portion of said striking surface located between said central portion and said toe end at a vertical distance above the ball's center of gravity and having the portion of said striking surface located between said central portion and said heel end at a vertical distance below the ball's center of gravity.

3,989,257
GOLF PUTTER
Samuel J. Barr, 1855 Medical Drive, Titusville, Fla. 32780
Filed Sept. 2, 1975, Ser. No. 609,289
Int. Cl.² A63B *53/04*
U.S. Cl. 273—175 5 Claims

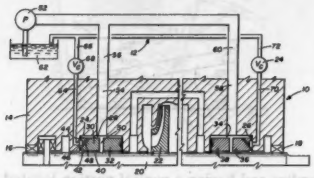


1. A golf putter comprising:
a putter head having a front driving face, and rear, top and bottom sides, said driving face having a substantially convex horizontal elliptical curve of extended focal length;
said putter head driving face having a substantially convex vertical elliptical curve thereby forming a face of intersecting elliptical surfaces;
a shaft attached to the rear side of said putter head behind said driving face; and
a striking point indicator located on the top side of said putter head whereby striking a golf ball on the driving face of said putter head at the approximate indicator striking point will compensate for a slight wrist movement of the user.

3,989,258
SHAFT STIFFNESS CONTROL APPARATUS

Fred Kurt Kunderman, Olean, N.Y., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 6, 1975, Ser. No. 538,992
Int. Cl.² F16J *15/48*
U.S. Cl. 277—29 7 Claims



1. Improved shaft stiffness control apparatus for turbomachinery or the like that includes a hollow housing having at least one radially disposed face, a rotor shaft extending through the housing, a pair of spaced bearings in the housing rotatably supporting the shaft, and pressure fluid means for providing fluid under pressure for lubrication and sealing, the improvement comprising:

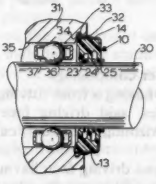
an annular seal located in the housing including a seal body having a first end and a second end, said second end being subjected to the pressure fluid in the housing, a bore extending through said ends for rotatingly and sealingly receiving the shaft, said first end including a pair of spaced, axially projecting annular flanges for sealingly and frictionally engaging the radial face, and a relatively small passageway extending through said body from said first end between said flanges into fluid communication with the pressure fluid within the housing; and,

vent means for controlling the fluid pressure between said flanges thereby controlling the force that is exerted on said seal by the pressure fluid biasing said seal toward the radially disposed face.

3,989,259
LIP SEAL WITH IMPROVED BORE RETENTION AND INSTALLATION INCLUDING THE SEAL

John J. Lorenz, Chagrin Falls, Ohio, and Jon A. Chandler, Farmington Hills, Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.

Continuation-in-part of Ser. No. 506,057, Sept. 16, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,113
Int. Cl.² F16J *15/32*
U.S. Cl. 277—169 11 Claims



1. A machine installation comprising a housing member having a bore, a cylindrical shaft, and a lubricant-retaining shaft seal interposed between said bore and said shaft in sealing engagement with them both, the bore holding said shaft seal in non-rotating engagement while said shaft rotates, characterized by:

said bore having a cylindrical portion succeeded by an annular groove of generally semicircular cross section, said groove leading to a generally radially inwardly extending annular wall,

said shaft seal having a metal supporting member and an elastomeric element,

said supporting member having a continuous cylindrical portion substantially smaller in outer diameter than the cylindrical portion of said bore, and having at a free end a series of spaced-apart angularly outwardly deflected portions that terminate at an outer diameter slightly greater than the diameter of the cylindrical portion of said bore and smaller in diameter than said annular groove.

said elastomeric element being bonded to said supporting member and extending radially inwardly to provide a plurality of spaced-apart flexible lips that terminate at an inner diameter substantially smaller than the diameter of said shaft, to provide considerable shaft interference,

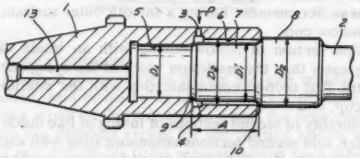
said elastomeric element also providing a bore-engaging portion on the radially outer surface of said cylindrical portion of said supporting member to cover completely, but barely, said angularly outwardly deflected portions and to provide axially inwardly therefrom a cylindrical portion axially shorter than said supporting portion and of outer diameter greater than the diameter of said bore's cylindrical portion but smaller than the diameter of said annular groove.

whereby on installation said bore-engaging portion of said elastomeric element is caused to deform into said annular groove as well as to lock with said bore's cylindrical portion, said metal angularly deflected portions being flexed radially inwardly on movement axially toward said groove and then springing back outwardly to help lock in said groove and prevent movement of said seal out from a final position bearing against said generally radially extending wall of said bore, said elastomeric bore-engaging portion also helping to prevent relative rotation between said shaft seal and said bore.

3,989,260
SECTIONAL TOOL UNIT, PARTICULARLY FOR TOOLS WITH A CYLINDRICAL SHANK

Simeon Dontchev Zonkov; Alexander Yordanov Zarvenkov; Konstantin Kirilov Tchobanov, and Nikolay Vassilev Baliev, all of Sofia, Bulgaria, assignors to DSO "ZMM", Sofia, Bulgaria

Filed Oct. 4, 1974, Ser. No. 512,125
Claims priority, application Bulgaria, Feb. 9, 1973, 22683
Int. Cl.² B23B *31/30*
U.S. Cl. 279—4 3 Claims



1. A sectional tool unit for machine tools, said unit comprising a tool with a shank which is a body of revolution, and a tool holder having a passage therein which matingly receives said shank with an interference fit, the passage in the tool holder being formed of two aligned cylindrical bores of different diameters separated by a circumferential groove, the groove and the two cylindrical bores in the tool holder being connected to the exterior of the tool holder body by a passage extending through said body, the shank of the tool having an external surface formed of two aligned cylindrical surfaces of different diameters and two frustoconical surfaces one of which is disposed at the outer end of the tool shank, while the

other connects the two circular cylindrical surfaces of the shank, the relaxed diameters of the tool bores in the tool holder being slightly smaller than the diameters of the respective cylindrical surfaces on the shank of the tool, the shank of the tool being press fitted into the passage in the tool holder.

3,989,261

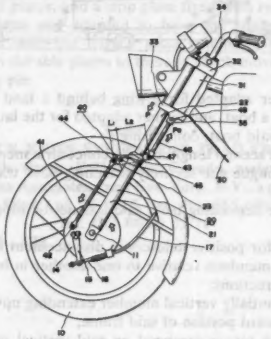
MOTORCYCLE FRONT-WHEEL SUSPENSION WITH MEANS FOR RESTRAINT OF COMPRESSION OF A TELESCOPIC FRONT UPON BRAKING

Takeshi Kawaguchi, Fujimi, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 24, 1975, Ser. No. 598,986

Int. Cl.² B62K *25/08*

U.S. Cl. 280—276 **13 Claims**



1. In a front-end suspension for a motorcycle which includes a front fork having a pair of telescopic shock absorbers, and a brake on a front wheel, the combination thereof with:

braking detector means for detecting the application of said brake on said front wheel;

said braking detector means including a braking detector member which is arranged for angular displacement relative to said front fork upon application of said brake; and

locking means actuated by said braking detector member for locking said telescopic shock absorbers in substantially fixed telescopic state;

whereby said front fork is telescopically fixed when said brake is applied.

3,989,262

MOTORCYCLE WITH BRAKE TORQUE TRANSMITTING WHEEL MOUNTING SPINDLE

Stefan George Bauer, Hilton, England, assignor to Norton Villiers Triumph Limited, London, England

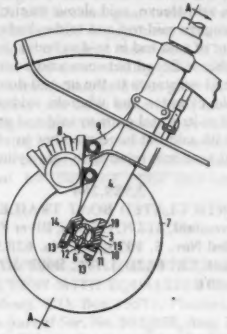
Filed May 22, 1975, Ser. No. 579,913

Claims priority, application United Kingdom, May 23, 1974, 22037/74

Int. Cl.² B62K *21/02*

U.S. Cl. 280—279 **9 Claims**

1. A motor cycle comprising a pivotally mounted steerable front wheel fork having parallel legs, a torsionally stiff tubular wheel spindle extending between the lower free ends of the fork legs, each end of the spindle being of non-circular cross-sectional shape, means rotatably mounting a front wheel hub on said spindle, a brake element rotatable with said hub, brake means mounted on one of said legs disposed for operative coaction with said brake element, and means for positively clamping the ends of the spindle non-rotatably to said fork legs whereby when said brake means is actuated the resultant



brake torque reaction effective on said one leg is transmitted by said spindle to be shared by said other leg.

3,989,263

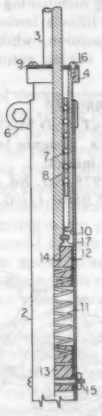
SHOCK ABSORBING SEAT POST

Gregory A. Stuck, and Albert C. Stuck, both of 3176 Fisher Ave., Bay City, Mich. 48706

Filed Mar. 17, 1975, Ser. No. 559,399

Int. Cl.² B62K *19/36*

U.S. Cl. 280—283 **2 Claims**



1. A shock absorbing seat assembly for use on a bicycle or the like, said assembly comprising an upright cylinder, a seat unit mounted on said cylinder and comprising a seat member and a rod secured to and extending downwardly from said seat member, said rod being telescoped within said cylinder for up and down movement therein, spring means in said cylinder engaged with said rod and urging said rod and said seat in an upward direction, bearing means supporting said rod in said cylinder during up and down movement of said rod in said cylinder, and position stabilizing means for said seat connected to and extending between said seat unit and said cylinder to prevent rotation of said seat unit relative to said cylinder wherein said position stabilizing means comprises a flat band member connected to and extending between said seat unit and said cylinder, said band member preventing rotation of said seat unit relative to said cylinder and offering minimal resistance to said up and down movement of said rod in said

cylinder, and wherein said bearing means comprises a bearing unit having a sleeve with a plurality of holes formed therein, ball being rotatably mounted in each of said holes, said balls extending from said sleeve, said sleeve encircling said rod so that said balls engage said rod and said cylinder during up and down movement of said rod in said cylinder, and wherein said flat band member is flexed between said connections to provide said minimal resistance to the up and down movement of said rod in said cylinder and wherein said spring means is fixedly secured at its distal ends to said rod and to said cylinder, coacting with said flat band member to yieldably prevent rotation of said seat unit relative to said cylinder.

3,989,264

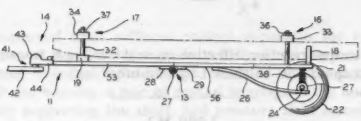
ARTICULATED BOAT TRAILERS

Norman H. Lovendahl, 814 N. Clinton, River Forest, Ill. 60305

Filed Nov. 5, 1975, Ser. No. 628,918

Int. Cl.² B62D *53/06;* **B60P** *3/10*

U.S. Cl. 280—401 **9 Claims**



1. A boat trailer arrangement,

said arrangement comprising trailer bed means,

clamp means for clamping a boat to said trailer,

wheel means attached to said trailer bed,

ball and socket hitch means for hitching said trailer to the rear of a towing automobile,

said hitch means including maintaining means for enabling lifting said trailer bed from a horizontal position to a substantially vertical position, while maintaining said trailer hitched to the towing automobile with wheel means still attached.

3,989,265

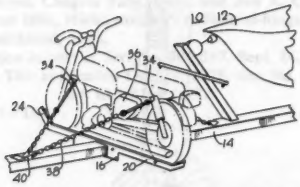
TRAILER FOR BOAT AND MOTORCYCLE

Robert W. Smiley, Salem, Va., assignor to The Raymond Lee Organization, Inc., a part interest

Filed June 16, 1975, Ser. No. 587,319

Int. Cl.² B60R *11/00*

U.S. Cl. 280—414 R **4 Claims**



1. A trailer for supporting a boat and at least one motorcycle which comprises:

a horizontally elongated longitudinally disposed bar having boat carrying means supported thereon;

first and second like parallel vertical plates secured to said bar in spaced positions, said plates extending upward from the bar and outward from opposite sides of the bar at right angles thereto, each plate having two horizontally spaced holes therein, each hole in one plate being aligned with the corresponding hole in the other plate to form a hole set;

a horizontally elongated member being adapted to support the front and rear wheels of a motorcycle or the like extending at right angles to the bar, said member being disposed between said plates and extending outward past the plates on both sides of the plates, said member having two horizontally spaced transversely disposed horizontal bore, each bore being aligned with and disposed between the holes in the corresponding hole set, the top of one end of the member having a raised lip, the other end of the member being upwardly inclined, said member pivotally engaging said bar; and

first and second like elongated manually operable locking means, each means extending removably through a corresponding hole set and corresponding aligned bore.

3,989,266

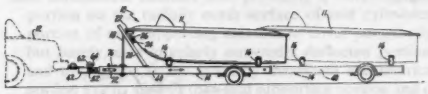
BOAT TRAILER

Paul L. Foster, P.O. Box 1463, Vero Beach, Fla. 32960

Filed Apr. 18, 1975, Ser. No. 569,486

Int. Cl.² B60P *3/10*

U.S. Cl. 280—414 R **8 Claims**



1. A trailer adapted for towing behind a land vehicle for transporting a boat, and further adapted for the launching and mooring of said boat, comprising:

a. first and second longitudinally concentric members defining a tongue for securely attaching said trailer to said vehicle;

b. a frame depending from said tongue for supporting said boat;

c. means for positive telescopic displacement of said concentric members relative to one another in both longitudinal directions;

d. a substantially vertical member extending upwardly from the forward portion of said frame;

e. aperture means arranged on said vertical member in a position contiguous to the bow of said boat when in a trailered position;

f. means attached to said boat for selectively engaging said aperture means in grasping relationship, comprised of a ring member having at least two sections capable of being displaced with respect to one another to selectively open and close said ring; and,

g. means positioned in said boat for activating said selective engaging means comprising a positive displacement member connected to said ring sections.

3,989,267

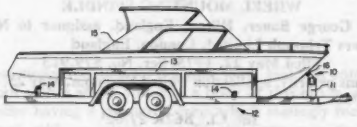
BOAT LATCH

Norman D. Robinson, 2314 Bryan Ave., Salt Lake City, Utah 84108

Filed Sept. 23, 1974, Ser. No. 508,068

Int. Cl.² B62D *3/10;* **B63C** *3/10, 13/00;* **B66C** *13/02*

U.S. Cl. 280—414 R **13 Claims**



1. A boat latch for securing a boat or the like having a bow ring to a trailer, comprising

a base plate;

means for mounting the base plate to a trailer;

a pair of spaced-apart side plates fixed to and extending upwardly and in a forwardly direction of the base plate, said side plates having aligned holes therethrough, and said holes being above and forwardly of the base plate;

an elongate housing fixed to one of said side plates and extending outwardly therefrom, said housing having a rear wall remote from the side wall and an opening therethrough;

a rod extending into the housing through the opening in the rear wall thereof, said rod having a handle on the end thereof outside said housing and a locking pin on the other end thereof;

means biasing the locking pin through the side plate to which the housing is affixed and into the aligned hole through the other side plate;

a trigger plate; and

means mounting the trigger plate between the side plates to be moved by the bow of a boat between a first position blocking movement of the locking pin into the aligned hole in the other side plate and a second position wherein said locking pin can be biased through the bow ring of a boat into the aligned hole in the other side plate, said means comprising a pivot shaft to which the trigger plate is connected, said pivot shaft being pivotally connected to the side plates, and a stop plate fixed with respect to said side plates and adapted to have the trigger plate rest thereon with the trigger plate extending between the holes in the side plates to thereby block movement of the locking pin.

3,989,268

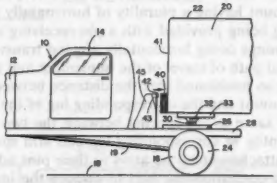
ANTI-JACK KNIFE SYSTEM FOR TRAILER TRUCKS

Kenneth Lyle Rawn, Willowdale, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 7, 1975, Ser. No. 565,600

Int. Cl.² B62D 53/10

U.S. Cl. 280—432 **2 Claims**



1. An anti-jack-knifing safety device for use on tractor-trailer combination vehicles in which there is a tractor and at least one trailer coupled to the tractor for being towed thereby, said safety device comprising first main safety device body means constructed and arranged for being carried by said tractor, second main safety device trailer coupling means constructed and arranged for being carried by said trailer, and moving coupling means carried by said first main safety device body means and constructed and arranged for being brought into operation by the driver operator of said vehicle for blocking said tractor and trailer against jack-knifing relative movement relative to each other, said second main safety device trailer coupling means comprising a second rack body means, a plurality of second gear teeth carried by and projecting outwardly from said second rack body means, and wherein said first main safety device body means comprises a first rack body means, a plurality of first gear teeth carried by and projecting outwardly from said first rack body means, said first and second gear teeth being constructed and arranged for mutual intermeshment together when brought into contact engagement with each other, and gear rack anchoring means for blocking angular rotation of said gear rack body means relative to respective related the tractor and trailer on which they are mounted, said gear rack anchoring means comprising a second gear rack anchor secured fixedly to an end of said trailer for blocking rotation of said second gear rack relative to its said supporting trailer, and wherein said gear rack anchoring means comprises a first gear rack anchor body means secured fixedly to a rear portion of said tractor, said first rack body means being moveable from retracted position out of engagement with said second gear teeth, to extended intermeshed position in toothed engagement with said second gear teeth, so as to block rotational movement of said trailer relative to said tractor and thus avoiding jack-knifing, and wedge means disposed intermediate said first gear rack anchor body means and said first rack body means, and moving means for moving said wedge means from retracted position to extended position for moving said first rack body means and its said teeth into meshed engagement with said second gear teeth on said trailer, and for blocking axial jack-knifing rotation thereof.

3,989,269

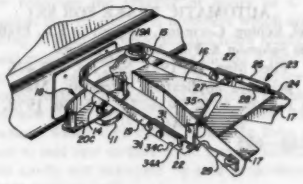
SWAY CONTROL DEVICES UTILIZABLE IN CONJUNCTION WITH EQUALIZER HITCHES

William L. Rendessy, P.O. Box 15571, Phoenix, Ariz. 85060

Continuation-in-part of Ser. No. 502,058, Aug. 30, 1974, Pat. No. 3,920,266. This application Nov. 17, 1975, Ser. No. 632,243

Int. Cl.² B60D 1/00

U.S. Cl. 280—446 B **19 Claims**



1. A sway control device adapted for mounting onto the rear portion of a towing vehicle provided with a pivotal hitch employing a hitch ball having a ball portion, a flange portion connectable to said ball portion and a threaded shank portion, the ball portion being connectable to a coupler provided for the tongue of a trailer comprising in combination:

a curved guiding means for frictionally engaging the surface of a friction inducing means positioned for limited movement along a curved surface of said guiding means and attached to the trailer comprising two spaced apart curved portions having ends curved toward the tongue of the towed trailer when the coupler is mounted on the hitch ball,

said curved guiding means securable to said towing vehicle adjacent to said pivotal hitch connection,

said curved portions being laterally positioned an equal distance one on each side of said pivotal hitch connection with said ends spaced apart from each other not less than 4 inches and not more than 20 inches.

3,989,270

HITCH CONSTRUCTION

Charles R. Henderson, 255 W. 1st South, Vernal, Utah 84978

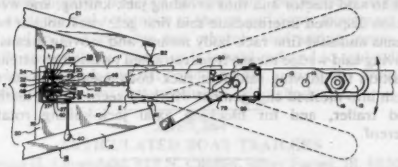
Filed Apr. 17, 1975, Ser. No. 568,921

Int. Cl.² B60D 1/16

U.S. Cl. 280—478 A **11 Claims**

1. An extensible and retractable, split hitch construction including, in combination, a drawbar constructed for mounting to a trailer, a movable tongue slideably secured to said drawbar for elongate extension and retraction, said tongue having an elongate hollow interior and an outer extremity provided with a tractor connection, vertical pivot means intercoupling said tongue to said drawbar for enabling the horizontal pivotal displacement of said tongue relative to said draw-

bar, on opposite sides thereof, when said tongue is in an extended position, first means for constraining said tongue to axial alignment with said drawbar when said tongue is in a retracted position relative to said drawbar, second means for releasably securing said tongue to said drawbar in a retracted position, and third means intercoupling said tongue to said



drawbar for selectively mechanically pulling said tongue toward retracted position relative to said drawbar, said third means comprising a flexible elongate connector, constrained within said hollow interior of said tongue and extending rearwardly thereof and anchored to said drawbar and a winch carried by said movable tongue and operatively engaging said flexible elongate connector.

3,989,271

AUTOMATIC BRAKE FOR SKI

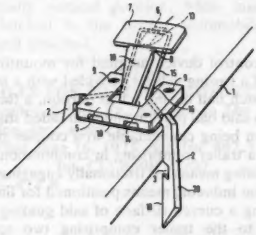
Tilo Riedel, Eching, Germany, assignor to S.A. Etablissements Francois Salomon & Fils, Annecy, France

Filed Mar. 12, 1975, Ser. No. 557,476

Claims priority, application Germany, Mar. 15, 1974, 2412623; July 26, 1974, 2436155; Feb. 20, 1975, 2507371

Int. Cl.² A63C 7/10, 11/02

U.S. Cl. 280—605 **11 Claims**



1. In a device for braking of a ski upon the release of a skiboot from a binding thereof, comprising a support member mounted on said ski, a brake element pivotably mounted for swinging movements between a retracted inoperative position permitting free skiing and an operative brake position wherein said element is engageable with a snow surface to hold the ski released from the skiboot, and spring means acting upon said brake element for swinging same between said inoperative position and said operative position upon release of the skiboot from the ski, the improvement wherein:

said spring means is formed as a generally U-shaped bent spring wire having a pair of shanks and a bight;

at least one of said shanks is bent at an angle to form an offset portion, said support member being formed with a cam means for engaging said shanks to stress said wire upon the retention thereof by a skiboot and cause said wire to spring into said operative position upon release by said skiboot, said offset portion being swingable in said support member and forming a pivot for said brake element;

said bight is formed with an actuating member movable relative to said support member and forming a pressing surface engageable by a skiboot to retain said wire in said inoperative position while said surface is engaged by the skiboot; and

a pair of such brake elements are disposed along opposite edges of the ski, each of said brake elements being secured to a respective shank of said wire.

3,989,272

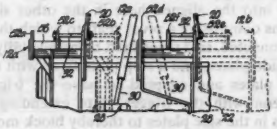
VARIABLE OFFSET HITCH

James Edson McCanse, and Timothy A. Sevick, both of Oregon, Ill., assignors to Hesston Corporation, Hesston, Kans.

Filed July 17, 1975, Ser. No. 596,612

Int. Cl.² B60D 1/16

U.S. Cl. 280—460 A **7 Claims**



1. In combination with a tractor having a three-point hitch including a pair of powered, vertically swingable lift arms, an implement adapted to be towed by said tractor, and structure for coupling the implement with the tractor, said structure comprising:

a pair of spaced mounts rigidly secured to the implement; and

a removable connecting pin for each mount respectively adapted for pivotal attachment to corresponding arms,

each mount having a plurality of horizontally spaced lugs,

each lug being provided with a pin-receiving opening,

the openings being horizontally aligned transversely of the normal path of travel of the implement and all of the lugs being so positioned that the distance between any lug of one mount and the corresponding lug of the other mount is the same as the spacing between the two arms,

said identity in corresponding lug and arm spacing permitting attachment of the arms to their pins adjacent preselected corresponding lugs to dispose the implement in a normal trailing disposition behind the tractor, offset to the left of the normal trailing disposition relative to the path of travel of the tractor or offset to the right of the normal trailing disposition relative to the path of travel of the tractor.

3,989,273

HEEL MOUNTING DEVICE FOR SKI BINDING

Hans Schmidt, Neu-Germering, Germany, assignor to Hannes Marker, Garmisch-Partenkirchen, Germany

Filed June 23, 1975, Ser. No. 589,005

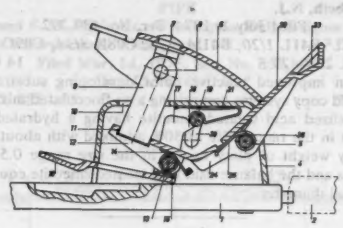
Claims priority, application Germany, July 12, 1974, 2433714

Int. Cl.² A63C 9/08

U.S. Cl. 280—631 **9 Claims**

1. A mounting device for the heel of a ski boot in a ski binding for a ski, comprising a frame member securable to the ski, a sole depressor pivotable on the frame from an inoperative position to a sole-engaging operative position about a pivot shaft disposed behind the heel transversely to the length of the ski, a first spring biassing the sole depressor to its operative position, a locking arm disposed in the pivoting plane of the sole depressor and carried at one end portion by said sole depressor, a clamping lever disposed in the pivoting plane of the sole depressor and pivoted to said frame member about a pivot pin parallel to said pivot shaft, said clamping lever containing a hole through which said locking arm passes with little

play and said clamping lever being biassed by a second spring towards said one end portion of the locking arm so that the clamping lever normally assumes a clamping position in which the locking arm is canted in the hole, and a handle for deliberately freeing the sole depressor for movement to the inoperative position by acting on the clamping lever to pivot same against the action of said second spring to a releasing position in which the locking arm is not canted in the hole.



3,989,274

DEVICE FOR SKI BINDINGS

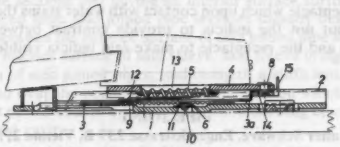
Erwin Weigl, Brunn am Gebirge, and Josef Svoboda, Schwechat, both of Austria, assignors to Gertsch AG, Zug, Switzerland

Filed Sept. 19, 1975, Ser. No. 614,890

Claims priority, application Austria, Sept. 20, 1974, 7604/74

Int. Cl.² A63C 9/22

U.S. Cl. 280—634 **5 Claims**



1. An adjusting mechanism for a ski binding, comprising:

base means;

guide means on said base means;

carriage means movably guided on said guide means, said carriage means comprising first and second relatively movable and parallel plates movable in directions parallel to said guide means, one of said first and second plates having said ski binding mounted thereon and movable therewith;

resilient means connected to and extending between said first and second plates for resiliently urging said first and second plates in opposite directions;

fixed stop means mounted on one of said first and second plates;

adjustable stop means mounted on the other of said first and second plates for movement into and out of engagement with said fixed stop means for initially adjusting the relative position between said first and second plates and establishing a selected preloaded return force for said resilient means; and

releasable locking means for releasably locking said carriage means to said base means.

3,989,275

INTERIOR ENERGY ABSORBNG MEANS FOR VEHICLES

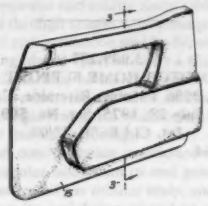
Peter Molyneux Finch, Oxford; Robert William Goff, Oxon, and Christopher John Sykes, Oxford, all of England, assignors to British Leyland UK Limited, London, England

Filed June 4, 1975, Ser. No. 583,833

Claims priority, application United Kingdom, June 4, 1974, 24607/74

Int. Cl.² B60R 21/04

U.S. Cl. 280—751 **2 Claims**



1. In a vehicle having a passenger compartment at least in part defined by rigid members, the improved energy absorbing means for reducing the severity of injury to a passenger thrown against one of said rigid members which comprises:

a moulding of rigid synthetic plastics foam material overlying said member, said moulding having a rear surface in contact with said member and a front surface facing in the opposite direction, and said moulding defining at least one hollow cavity open at said rear surface and integral projections within said cavity extending from said front surface to said rear surface while leaving substantially all of said cavity not occupied by said projections open at said rear surface, and

a layer of less rigid force-distributing foam secured to and covering the front surface of said moulding.

3,989,276

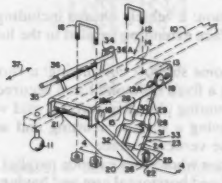
JACK STAND

Arthur J. Hamerl, 336 Trafford Drive, NW., Calgary, Alberta, Canada

Filed May 19, 1975, Ser. No. 578,636

Int. Cl.² B60S 9/04

U.S. Cl. 280—763 **3 Claims**



1. A jack stand for attachment to a standard hitch bar comprising in combination a mounting plate component, said component including a channel section having a web and a flange extending at right angles from each side edge of said web, said channel section engaging under said hitch bar with said web on the under side of said hitch bar and said flanges depending downwardly one upon each side of said hitch bar, front and rear pivot pins bearably engaging between said flanges below said hitch bar, a ground engaging skid plate mounted for pivotal action by one end thereof to said front pivot pin, said ground engaging skid plate extending downwardly and rearwardly from said front pivot pin, an over-center locking linkage mounted for pivotal action by one end thereof to said rear pivot pin and by the other end thereof to

adjacent the other end of said skid plate, said over-center locking linkage extending upwardly and rearwardly from said lower end of said skid plate towards said rear pivot pin when in the extended position, said over-center locking linkage including a lower portion having a bifurcated upper end, bearing sleeves formed on said upper end, an upper portion, said upper portion, having a bearing pin secured to the lower end thereof and engaging said bearing sleeve, and an over-center linkage stop extending from said bearing pin, said stop having transverse extensions engaging said bifurcated end of said lower portion when in the extended supporting position.

3,989,277

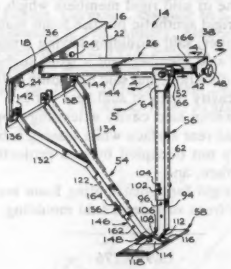
MOTOR HOME SUPPORT

Patrick H. Stahl, 3986 Twining, Riverside, Calif. 92509

Filed July 28, 1975, Ser. No. 599,650

Int. Cl.² B60R *27/00*

U.S. Cl. 280—764 **5 Claims**



1. In combination: a vehicle chassis including a frame having a vertical surface extending parallel to the longitudinal axis of said frame;

and a motor home support comprising: a vertical mounting plate having a fixed horizontal arm secured thereto adjacent the mounting plate top surface, said vertical mounting plate having a surface abutting and secured to said chassis frame vertical surface;

a rotatable screw whose axis extends parallel to the longitudinal axis of said horizontal arm and having a movable nut positioned on said screw, said screw having means formed thereon for rotating said screw;

a planar ground support plate movable from adjacent one end of said arm to a ground engaging position wherein said ground support plate is in a plane parallel to the plane of said horizontal arm;

a pivot junction fixed to one side of said ground support plate;

a first support leg pivotally interconnected between said mounting plate adjacent said mounting plate bottom surface, and said ground support plate at said pivot junction; and

a second support leg pivotally interconnected at one end to said ground support plate at said pivot junction and at the other end to said movable nut.

3,989,278

REACTIVE COLOR DEVELOPING SUBSTRATES FOR MANIFOLD COPY SYSTEMS AND PROCESS FOR PRODUCING SAME

Andrew Torok, Parsippany, and Thomas F. Walsh, Florham Park, both of N.J., assignors to Georgia Kaolin Company, Elizabeth, N.J.

Filed July 1, 1974, Ser. No. 484,392

Int. Cl.² B41L *1/20;* **B41M** *5/16;* **C08K** *3/34;* **C09C** *3/00*

U.S. Cl. 282—27.5 **14 Claims**

1. An improved reactive color developing substrate for manifold copy systems comprising a co-flocculated mixture of colloidalized acid treated smectite having a hydrated silica content in the range 15% to 30% admixed with about 9% to 50% by weight of platy kaolin in the size range 0.5 to 10 microns and the balance said acid treated smectite equivalent spherical diameter.

3,989,279

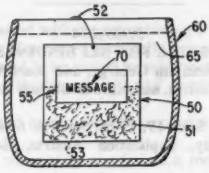
LATENT INDICIA CARRIER

Leon M. Levy, 2047 Dayton St., Chicago, Ill. 60614

Filed June 4, 1975, Ser. No. 583,544

Int. Cl.² B42D *15/00*

U.S. Cl. 283—8 B **3 Claims**



1. A receptacle formed of a non-woven cellulosic material, indicia impressed on one exposed surface of said receptacle which is normally substantially indistinguishable, tea inside the receptacle which upon contact with water stains the receptacle but not the indicia to provide contrast between said indicia and the receptacle to make said indicia visible.

3,989,280

PIPE JOINT

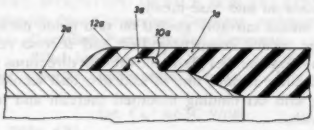
Ing. Walter Schwarz, Engerthstrasse 237 B, Vienna 2, Austria

Filed Sept. 10, 1973, Ser. No. 395,942

Claims priority, application Austria, Sept. 18, 1972, 7996/72; Apr. 25, 1973, 3693/73

Int. Cl.² F16L *13/02*

U.S. Cl. 285—21 **1 Claim**



1. In a pipe joint where end portions of two pipes are telescopically interfitted, one pipe being of reinforced plastic reinforced by plastic impregnated rovings including the end portion thereof interfitting with the second pipe, and the second pipe being of metal including the end portion interfitting with the pipe of reinforced plastic, the end of the metal pipe being telescoped into the end of the reinforced plastic pipe:

said end portion of the metal pipe having a peripheral shoulder thereon, and the plastic impregnated rovings at said end portion of said reinforced plastic pipe being wound

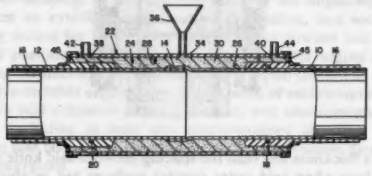
tightly about said end portion of the metal pipe to complementally fit all surfaces of said shoulder.

3,989,281

JOINT SYSTEM FOR FILAMENT WOUND ALUMINUM PIPE

Raymond S. M. Wilde, Jr., Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Mar. 14, 1975, Ser. No. 558,398
Int. Cl.² F16L *11/12*
U.S. Cl. 285—45 **7 Claims**



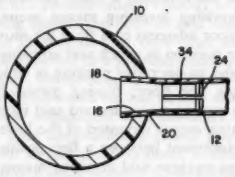
1. A joint system for filament reinforced aluminum pipe comprising (a) at least a first aluminum pipe section and a second aluminum pipe section, each pipe section having mating ends, and each pipe section being in direct contact with and reinforced throughout its length, except for a small portion of the length of each pipe adjacent the mating ends thereof, with high strength filaments in a matrix material, each pipe section having a seal means contiguous with the external surface of the aluminum pipe about the circumference thereof, said seal means being forced into engagement with the external surface of each pipe by the filament reinforcement wound over said seal means of each pipe and said seal means being spaced from the end of the filament reinforcement at the mating end of each pipe section, said pipe sections being in mating engagement and welded or soldered at the junction of the mating pipe ends, (b) a sleeve encompassing said pipe sections and having an interior surface surrounding and spaced from said joined pipe sections thereby defining a cavity between the exterior surface of said joined pipe sections and the interior surface of said sleeve, said sleeve bridging the junction of said joined pipes, and being of a sufficient length to extend over the portions of each pipe section which is not filament reinforced, and (c) a cured thermosetting compound filling said cavity.

3,989,282

PLUG-TYPE DEVICE FOR INTERCONNECTING CONDUITS

Harry M. Zimmerman, San Diego, Calif., assignor to Reed Irrigation Systems, El Cajon, Calif.

Filed Aug. 11, 1975, Ser. No. 603,493
Int. Cl.² F16L *41/00*
U.S. Cl. 285—222 **1 Claim**



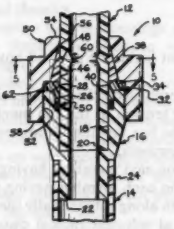
1. A fluid tight joint, comprising:
a wall bounding a space adapted to receive fluid pressure, said wall having an opening therethrough;
a semi-rigid conduit of outside diameter at least as small as that of the wall opening; and
an elongated tubular body of semi-rigid material having an axial inner passage extending therethrough, a conical outer surface on said body tapering from a maximum diameter at one end to a smaller diameter at an intermediate point spaced from the opposite end, the outer surface of said body between said intermediate end and said opposite end being substantially cylindrical, said tubular body having a flange at said opposite end in contact with the inside of the conduit, and a pair of slots extending from said opposite end axially along said cylindrical outer surface and through to said axial passage thereby forming a bifurcated end portion on said body, said bifurcated end portion being biased apart to exert a slight outward force on the inside surface of the conduit;
the total of said maximum diameter and twice the thickness of the semi-rigid conduit's wall being greater than the diameter of the wall opening;
said semi-rigid conduit being positioned circumjacent the elongated tubular body with its end generally coincident with said one end of the tubular body, and a portion of the conduit near its end being stretched over the conical outer surface of the tubular body to form a reinforced conical end portion of the conduit;
said reinforced conical end portion of the conduit, with the tubular body inside, being tightly wedged in the wall opening and oriented toward said space adapted to receive fluid pressure;
whereby, when fluid pressure increases in the space and in the conduit, the conduit end portion tends to become more tightly wedged in the wall opening to more tightly seal the joint.

3,989,283

COMPRESSION FITTING

Kenneth V. Pepper, Davison, Mich., assignor to Genova, Inc., Davison, Mich.

Filed July 23, 1975, Ser. No. 598,432
Int. Cl.² F16L *21/06*
U.S. Cl. 285—323 **2 Claims**



1. In combination, a flexible thermoplastics pipe and a compression fitting secured thereto and adapted to be connected to a rigid component of a piping system, said compression fitting comprising a body member having a through bore and adapted to be secured to said rigid component, said bore having a shoulder adjacent to one end of said body member, said flexible pipe being in a sliding-fit relation within said bore and having its end seated on said shoulder, said bore of said body member having a diameter at said one end equal to the inner diameter of said shoulder and equal to the inner diameter of said flexible pipe, said bore being recessed at its other end, an elastomeric seal ring in said recessed portion of the bore, a compression ring having an annular portion seated on said one end of the body member and a sleeve portion extending from said annular portion into said recessed portion into engagement with said seal ring to urge the latter into sealing engagement with said bore and flexible pipe, a conical-shaped

clamp ring having a base portion seated on said compression ring, said clamp ring having resilient properties and being split longitudinally to provide a slit when in an unstressed condition and having a through bore of cylindrical shape when said clamp ring is urged together to close the slit, the through bore of the closed clamp ring having essentially the same diameter as the outer diameter of said flexible pipe, said through bore of the split ring also defining an axially symmetrical V-shaped radially inward projection around its inner periphery penetrating into said flexible pipe without cutting or causing damage to said flexible pipe, and a compression nut having a through bore defining a conical configuration corresponding to the outer configuration of said clamp ring when the latter is closed, the bore at the one end of said compression nut having a diameter conforming essentially to that of said flexible tube, the other end of said compression nut being threadedly connected to said body member so that the conical configuration of said compression nut retains said clamp ring in its closed position around said flexible tube, the bore in said compression nut also defining a shoulder that is seated on said compression ring so as to limit axial movement of the portion of the bore defining said conical configuration to a position wherein the conical configuration has closed said slit in said clamp ring.

3,989,284

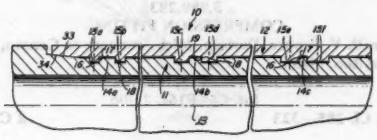
TUBULAR CONNECTION

Thomas L. Blose, Houston, Tex., assignor to Hydril Company, Los Angeles, Calif.

Filed Apr. 23, 1975, Ser. No. 570,633

Int. Cl.² F16L *25/00*

U.S. Cl. 285—332.2 **29 Claims**



1. In a pipe joint including pin and box members, the joint having an axis,

a. a pair of interengaged threads on said members for producing hoop tension in the pin member and hoop compression in the box member in response to forcible make-up of said members,

b. the threads on said members having dove-tail interfit,

c. said thread on each member having progressively changing axial width along substantially the entire helical length thereof and at selected radical distance from said axis, whereby upon complete make-up of the joint the interengaged thread flanks produce forces tending to urge the members radially together.

3,989,285

COMPATIBLE VACUUM SEAL

Gary K. Yancey, Athens, Tex., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 23, 1974, Ser. No. 535,241

Int. Cl.² F16L *23/00*

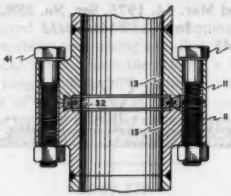
U.S. Cl. 285—336 **6 Claims**

1. In a high vacuum system an improved coupling between two adjacent elements comprising:

a pair of identical fittings each permanently attached to one of said elements and having coupling flanges surrounding a central aperture opening into said element the opposing surfaces of said flanges each defining a continuous outer contact surface and an inner continuous stepped recess surrounding said central aperture;

a pair of continuous knife members with spaced opposed cutting edges each of ramp shaped cross-section with a height less than the depth of said recesses mounted in said recesses;

a continuous gasket located in said recesses between said knife members having a hard central core member with



a thickness less than the spacing between said knife members when said outer contact surfaces are in abutment and a softer outer layer with a thickness greater than the spacing between said core member and each adjacent knife member; and

means to draw said flanges together until said contact surfaces meet whereby said knife members penetrate said outer layer but do not engage said central core member.

3,989,286

DEVICE FOR ARRESTING A DOOR

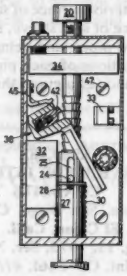
Herbert Cleff, Ennepetal, Germany, assignor to Dorma-Baubeschlag GmbH & Co. KG, Ennepetal-Voerde, Germany

Filed Oct. 9, 1974, Ser. No. 513,442

Claims priority, application Germany, Oct. 11, 1973, 2351042; Sept. 11, 1974, 2443444

Int. Cl.² E05C *1/08, 3/22, 5/00, 17/44*

U.S. Cl. 292—181 **17 Claims**



1. A device for arresting a door, particularly in an open position, comprising arresting means mounted at a lower portion of a door adjacent to a floor for movement between an inoperative position in which said arresting means is disengaged from, and an operative position in which said arresting means engages, the floor; biasing means for permanently biasing said arresting means toward said inoperative position thereof; latching means mounted at the lower portion of the door for displacement between a first position in which said latching means engages said arresting means to thereby prevent movement of the latter toward said inoperative position thereof, and a second position in which said latching means releases said arresting means for movement toward said inoperative position, and including a magnetically attractable portion; and electromagnetic means at the lower portion of the door and operative for magnetically attracting said mag-

netically attractable portion of said latching means to thereby hold said latching means in said first position thereof.

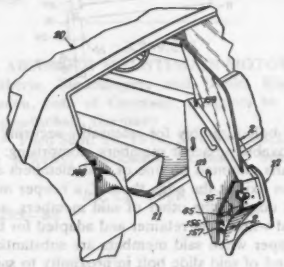
17. A device for arresting a door, particularly in an open position, comprising arresting means including a component formed with a plurality of teeth and mounted at the door adjacent a floor for movement between an inoperative position in which said arresting means is disengaged from, and an operative position in which said arresting means engages, the floor; first biasing means for permanently urging said component toward said inoperative position thereof; latching means including a latching member mounted at the door for displacement between an engaging and a disengaging position, a slide member mounted in said latching member for displacement between an extended and a retracted position, and second biasing means for urging said slide member toward said extended position thereof; third biasing means for urging said latching member toward said engaging position thereof so that said slide member engages one of said teeth of said component when in said extended position thereof; and electromagnetic means including at least one electromagnet operative for holding said latching member in said engaging position thereof when energized.

3,989,287

AUTOMOTIVE VEHICLE DOOR RETARDING AND CLOSING MECHANISM

Jay R. Sheesley, Glencoe, Ill., assignor to Keystone Industries, Inc., Rolling Meadows, Ill.

Filed Aug. 28, 1972, Ser. No. 284,230
Int. Cl.² E05C *3/06*
U.S. Cl. 292—201 **9 Claims**



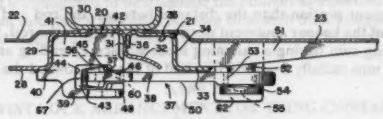
1. Mechanism for decelerating the door of an automotive vehicle or the like to a predetermined velocity to prevent said door from slamming against the body of said vehicle and for effecting complete closure of said door after the same has been slowed and has moved to a predetermined position with respect to said body, comprising, in combination, retarding means adapted to be mounted on one of said door and body and having a plunger engageable with the other of said door and body as said door approaches a closed position and to decelerate said door to said predetermined velocity, and closure means including a latch adapted to be mounted on one of said door and body and engageable with a striker adapted to be mounted on the other of said door and body, said latch coacting with said striker to effect movement of said door to a completely closed position, and said closure means including means for effecting movement of said latch to a position corresponding to said completely closed position of said door.

3,989,288

DOOR LOCK FOR RAILWAY CAR SLIDING DOORS

James J. Schuller, Crete, Ill., assignor to Pullman Incorporated, Chicago, Ill.

Filed May 27, 1975, Ser. No. 581,404
Int. Cl.² E05C *19/08*
U.S. Cl. 292—213 **4 Claims**



1. In a railway car having a side wall element with a door opening,

a door element supported on the side wall element for movement between open and closed positions,

a latch extending between said elements including a horizontal pivot mounted on one of said elements,

a hasp member connected to the pivot member for vertical swinging movement thereabout and having a body with a head at one end,

a socket member on the other element having an upwardly open pocket for receiving said head of the hasp therein,

said socket member having a first vertical wall with a vertical slot therein open upwardly and into the socket member and to the exterior and positioned to accommodate passage of a portion of the body adjacent to the head therein,

said slot dividing said first wall into inboard and outboard portions,

said socket member having a second vertical wall spaced laterally of the first wall and defining the opposite side of the socket widthwise of the latch,

said walls having opposing arcuate interior concentric abutment surfaces generated from the axis of said pivot member,

said head having edge portions with arcuate abutment surfaces opposing respective arcuate surfaces on said walls and complimental thereto,

a lug on each member having openings alignable in the locked position thereof adapted to receive securing means therethrough,

said surfaces providing means resisting vertical displacement of said hasp member in the locked position thereof during car movement tending to move the door back and forth thereby essentially eliminating shearing loads acting through said lugs on said securing means,

said head being substantially centered lengthwise on said body and said edge portions thereof projecting beyond opposite sides of the body, and

said inboard and outboard wall portions being disposed in opposition to and engageable with the respective portions of the head.

3,989,289

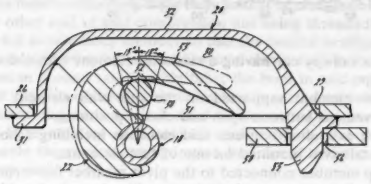
DOOR HARDWARE

Stephen J. Ringe, Detroit, Mich., assignor to Fruehauf Corporation, Detroit, Mich.

Filed Apr. 9, 1975, Ser. No. 566,237
Int. Cl.² E05C *3/14*
U.S. Cl. 292—241 **3 Claims**

1. In combination with a door frame structure defining a door opening and including a sill, a header and jambs, and a door hinged thereto, particularly for a cargo vehicle body or the like, fastening means for the door comprising a rod rotatably supported on and extending transversely of the door and projecting beyond a free edge thereof at a position spaced from the hinged edge of the door, a generally cylindrical keeper abutment portion supported on the frame structure

and extending parallel to the rod and located at a position which when the door is closed is close to the projecting portion of the rod and in an overlapping axially offset relation thereto, characterized by a hook-like locking cam secured to and extending laterally from the rod and rotatable by the rod into and out of overengaged holding relation with respect to the keeper abutment portion when the door is at and near the closed position, said cam having a free end which when the door is closed is farther from the rod and from the keeper abutment portion than the distance between the rod and the side of the keeper abutment portion farthest from the rod, said locking cam having a camming inner surface extending angularly non-radially from the free end of the cam toward the rod



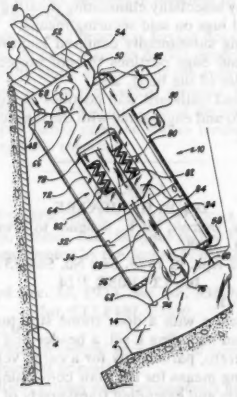
and terminating at an arcuate holding portion which is concentric with the axis of the rod but of a radius substantially exceeding that of the rod, the radius of the keeper abutment portion being substantially shorter than that of said arcuate holding portion, the cam being fast on the rod, and an operating handle attached to the rod and swingable to and from the door to rotate the cam into and out of overengaged relation, further characterized in that when the handle is fully moved toward the door and the cam is in its normal fully overengaged holding position, said concentric holding portion of the camming surface extends toward the free end of the cam for a substantial distance beyond the position of contact between the cam and the keeper abutment portion.

3,989,290

DEVICE FOR CLOSING A PRESSURE VESSEL

Gilles Aubert, Orsay; Gilles Barras, Bezons, and Didier Costes, Paris, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 24, 1975, Ser. No. 571,312
Claims priority, application France, May 2, 1974, 74.15283
Int. Cl.² E05C *1/00*
U.S. Cl. 292—256.65 **4 Claims**



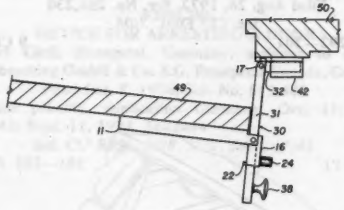
1. A device for closing the top plug of the prestressed concrete pressure vessel of a nuclear reactor against the plug seating, wherein said device comprises a plurality of closure elements uniformly spaced at the periphery of said closure plug, each closure element being applied at one end against the top face of said plug and at the other end against a corbel formed on the top extension of the pressure vessel, each closure element being essentially constituted by a jack body in which the closed extremity is rigidly fixed to a first articulated bearing shoe and by a piston which is capable of moving within said jack body under the action of a fluid under pressure, the extremity of said piston which emerges from said jack body being provided with an annular shoulder for preventing penetration of said piston into the interior of said jack body to the full extent, said jack body being provided with adjustable mechanical means for ensuring contact between said jack body and said annular shoulder of said piston irrespective of the position of said piston with respect to said jack body and for maintaining their position after reducing the pressure within the jack to zero, the emergent extremity of said piston being rigidly fixed to a second articulated bearing shoe.

3,989,291

CONTROLLED ACCESS SLIDE BOLT

Richard Hucknall, 3 Fairview Ave., Great Neck, N.Y. 11023

Filed May 12, 1975, Ser. No. 576,692
Int. Cl.² E05C *17/30*
U.S. Cl. 292—262 **27 Claims**



1. A slide bolt assembly for releasably securing a pair of relatively movable adjacent members, comprising: slide bolt retainer means mounted on one of said members and pivotable about an axis at the edge thereof, a keeper mounted at the adjacent edge of the other of said members, and a slide bolt mounted within said retainer and adapted for translation into said keeper when said members are substantially juxtaposed, the end of said slide bolt in proximity to said keeper, having a tongue pivotal about a transverse axis.

3,989,292

SEMI-PNEUMATIC ENERGY ABSORBING BUMPER SYSTEM FOR MOTOR VEHICLES

Thomas A. Bank, Carmel, Ind.; Jack E. Gieck, and David A. Weitzenhof, both of Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 426,615, Dec. 12, 1973, Pat. No. 3,902,748. This application Feb. 25, 1975, Ser. No. 552,932
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² B60R *19/10*
U.S. Cl. 293—71 P **5 Claims**

5. A semi-pneumatic energy absorbing and dissipating bumper system for interposition between two objects at least one of which is movable comprising:

elastomeric module means having an impacting face, upper, lower and side walls terminating in a continuous bead;

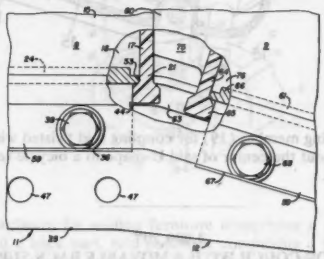
support means for mounting said module means on at least one of said objects including

a closure plate upon which said module means is mounted and

a backup structure carrying said closure plate;

a plurality of internal reinforcing ribs connecting only said impacting face to said upper and lower walls and terminating in a rear edge the configuration of which is spaced from sealing contact with said closure plate prior to impact of said module means with an object;

means for holding at least a portion of said continuous bead against said closure plate to form a cavity therebetween closed to the atmosphere; and,



means for permitting comunication between said cavity and the atmosphere upon the application of an external force of predetermined magnitude to said module means; said means including

valve means in said closure plate opening to the atmosphere upon an increase of pressure within said module means and

a space between between at least one of said walls of said module means and said closure plate formed during impact of said module means by the escape of air from therein.

3,989,293

SHOCK ABSORBER MOUNTING IN MOTOR VEHICLES

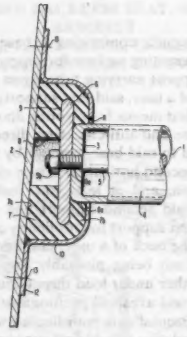
Fritz Häberle, Sindelfingen, and Daniel Riechers, Calw-Heumaden, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Sept. 16, 1974, Ser. No. 506,336

Claims priority, application Germany, Sept. 19, 1973, 2347075

Int. Cl.² B60R *19/06*

U.S. Cl. 293—88 **8 Claims**



1. A shock absorber fastening at a vehicle bumper comprising a cylindrical shock absorber housing; an impact plate externally fixed to an end of said shock absorber housing, said impact plate having a diameter substantially larger than the diameter of said cylindrical housing; a metal cap member detachably secured to a vehicle bumper, said metal cap member having an aperture through which said end of said shock absorber housing extends; and an elastic shock absorbing bearing material contained in said metal cap member for embedding said end of said shock absorber housing and said impact plate within said metal cap member such that said end of said shock absorber housing and said impact plate are both elastically supported by said elastic shock absorbing bearing material, wherein said elastic shock absorbing bearing material is configured to bear against the bumper at a portion apart from said shock absorber housing to absorb direct impacts on said bumper and to transmit said impacts to said impact plate.

3,989,294

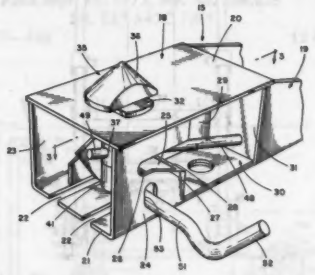
TWIST LOCK ARRANGEMENT FOR TYING CONTAINER DOWN

George W. Carr, Albuquerque, N. Mex., assignor to Pullman Incorporated, Chicago, Ill.

Filed Oct. 24, 1975, Ser. No. 625,448

Int. Cl.² B65J *1/22*

U.S. Cl. 296—35 A **15 Claims**



1. In a highway trailer including a chassis having a plurality of cross members,

a plurality of coupling assemblies located on lateral portions of the cross members, each assembly including,

a locking housing including a top wall and vertical wall means,

said top wall having an aperture including an upwardly projecting tubular shear block including a downwardly projecting tubular extension,

a vertically extending locking pin having an upper head portion on said shear block and a shank portion rotatably and vertically movable in said tubular extension, said extension projecting downwardly within said housing,

said vertical wall means including slot means having a downwardly inclined guide portion, the improvement comprising;

manual operating mechanism including,

a first operating member connected to said shank of said locking pin for rotating the same about its vertical axis,

a second operating member including a rod having handle means and being connected to said shank of said locking pin for rotatable movement relative thereto about a horizontal axis,

said rod being connected to said pin for vertical movement therewith and being supported on said housing against rotation during relative rotational movement of said locking pin shank about its vertical axis,

camming means connected to said rod including a stop member,

cam engageable means on said tubular extension,

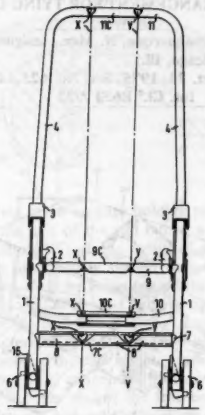
biasing means connected to said rod and housing for biasing said camming means in its locked position whereby said stop member engages said cam engageable means thereby locking said locking pin against vertical movement, and

means on said rod in the locked position engaging said first operating member to lock the same against rotation and maintain said head portion in its locked position.

3,989,295
FOLDING CHAIRS

Curtis A. Sparkes, 12 Highgate Road, Altrincham, Cheshire, England

Filed Nov. 4, 1974, Ser. No. 520,867
Claims priority, application United Kingdom, Nov. 19, 1973, 53593/73
Int. Cl.² A47C *4/42*
U.S. Cl. 297—39 **10 Claims**



1. A folding chair comprising a substantially parallel pair of similar folding side frames, each side frame including essentially a quadrilateral linkage of interpivoted bars, which bars can be pivoted relatively between an open position of use and a folded position wherein the bars lie side-by-side, and cross-members interconnecting the side frames, the cross-members having their ends each respectively integral with a bar of the respective side frame and the cross-members having hinges located only intermediately of their ends, the hinges being arranged in at least one set lying in a plane substantially parallel to the planes of the side frames and the axes of the hinges of said set lying out of coaxial alignment in the open position of the side frames but extending in coaxial alignment in the folded position of the side frames which can then close together like a book.

3,989,296
SADDLE

Yukio Naka, No. 1070, Tsuruhara, Izumisano, Osaka, Japan

Filed Apr. 23, 1975, Ser. No. 570,814
Claims priority, application Japan, June 3, 1974, 49-164459; June 3, 1974, 49-64458
Int. Cl.² B62J *1/02*
U.S. Cl. 297—209 **2 Claims**

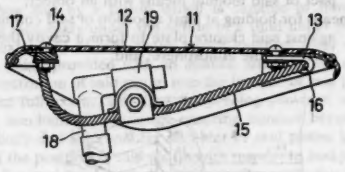
1. A bicycle or cycle saddle comprising in combination:

a. a saddle main body (12) of general triangular configuration with a narrow front and tip and a wide rear having a seat side and a bottom side;

b. a hook-shaped engaging member (13) at the bottom side tip;

c. a fastening member (14) including nuts and bolts at said wide rear on both sides thereof;

d. a twisted wire (15) extending in a U-shape between said fastening member (14) and said hook-shaped engaging member (13) the outer ends of said U-shape being held by said fastening member, said U-shape central portion by said hook-shaped engaging member, said twisted wire (15) consisting of at least two very resilient strands uniformly twisted together; and,



e. a fitting member (19) for coupling said twisted wire (15) at about the center of said U-shape to a bicycle seat post (18).

3,989,297
CHAIR OR COUCH WITH A MOVABLE BACK SUPPORT

Fritz Kerstholt, Am Wackenbach 11, D 6331 Leun, Germany

Filed Mar. 21, 1974, Ser. No. 453,395
Claims priority, application Germany, Mar. 26, 1973, 7311376[U]; July 13, 1973, 2335586
Int. Cl.² A47C *1/024*
U.S. Cl. 297—300 **42 Claims**

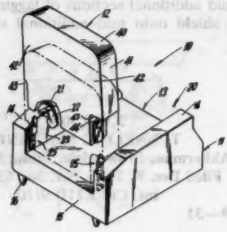
1. A chair or couch comprising a base member, a first support carrying a seating surface for supporting the seat of a user, a second support carrying a backrest member for supporting the back of a user, said first support connected to said base member by first means for pivoting about a first horizontal axis in clockwise and anti-clockwise direction, said second support connected to said base member by second means for pivoting about a second horizontal axis in clockwise and anti-clockwise direction, and at least one resilient means connected between said second support and one of said base member or said first support for resiliently urging said second support towards the back of a user, said first support and said second support each being pivotably displaceable independently of one another under load throughout the full range of movement about said axes and positionable in given positions and said first horizontal axis coordinated with said first support and located relative to said first support with a portion of said first support projecting forwardly beyond said first horizontal axis a sufficient extent permitting a user to adjust the inclination of said first support by varying the pressure, exerted by his thighs, on said forwardly projecting portion of said first support.

3,989,298

SEATING FURNITURE AND HARDWARE THEREFOR

Izchak Cycowicz, Brooklyn, and Alfred Frimmet, Larchmont, both of N.Y., assignors to Mohasco Corporation, Amsterdam, N.Y.

Filed Oct. 2, 1975, Ser. No. 618,955
Int. Cl.² A47C 1/02
U.S. Cl. 297—342 13 Claims



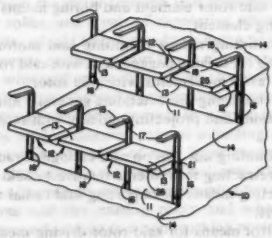
1. Hardware for seating furniture comprising a seat base part and a back part, said hardware comprising a back part mounting member adapted to be connected to the seat base part, a channel forming member adapted to be attached to the back part, said back part mounting member having a shank provided with parallel edges slidably receivable in the channel formed by said channel forming member, said channel forming member having a web wall interconnecting parallel side walls slidably engaging said parallel edges of said shank, said shank having an opening, and said web wall of said channel forming member being formed with a cut out and having a spring tongue cut from the said web wall and projecting into said cut out and normally disposed in said channel, and in the path of said shank when said shank is slid into said channel, and said tongue having a lip portion adapted to be flexed back out of said channel as said shank is slidably moved in said channel into contact with the tongue in said channel, and the lip portion of said tongue which is flexed back out of the channel being adapted to snap back into said opening in said shank, to be again disposed in normal condition in said channel, and said lip portion of said tongue having an edge adapted to contact an edge of said opening in said shank, to prevent said channel forming member from being pulled off said back part mounting member.

3,989,299

STADIUM RISER BACKLESS SEAT, SUPPORT AND ARMREST

David C. De Long, 1221 Broad St., Grinnell, Iowa 50112

Filed July 7, 1975, Ser. No. 593,767
Int. Cl.² A47C 7/54
U.S. Cl. 297—411 9 Claims



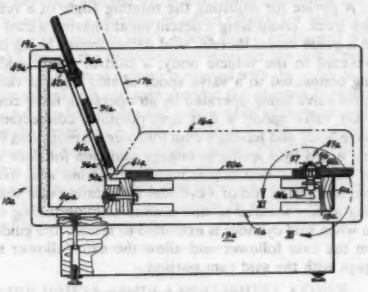
1. In step riser mounted seating: individual seat means including, structural members adapted to be mounted to the upright face of a step riser at each side of a seat; individual seat bottom means adapted for being mounted between and by two of said structural members; said structural members being extended transversely above and below said individual seat bottom means mounted thereby; with the upper longitudinally extending portions of said structural members formed over by substantially ninety degrees so as to coextend with, and be substantially parallel to, said seat bottom means, to provide armrest sections above and to each side of said individual seat bottom means; each of said structural members being a continuous expanse of U-shaped channels with the exterior surface of the channel web adapted to be juxtaposed with, and mounted to, the upright vertical face of a step riser; and with such channel web exterior surface presenting upward facing armrest surfacing.

3,989,300

FURNITURE CONSTRUCTION WITH REMOVABLE CUSHIONS

Jules M. Heumann, San Francisco, Calif., assignor to Metropolitan Furniture Manufacturing Co., South San Francisco, Calif.

Filed Sept. 19, 1973, Ser. No. 398,635
Int. Cl.² A47C 7/00
U.S. Cl. 297—440 12 Claims



1. A furniture construction comprising

a generally horizontally disposed bottom frame,

a generally upright back frame secured to said bottom frame,

a seat cushion comprising a rigid first support member secured thereunder to overlie and rest on said bottom frame, and

a back cushion comprising a rigid second support member secured thereunder to overlie and rest on said back frame in unattached relationship therewith,

said back frame having a first retaining member disposed adjacent to an upper end thereof,

a second retaining member secured on a back side of said second support member and engaging an underside of said first retaining member in unattached relationship therewith,

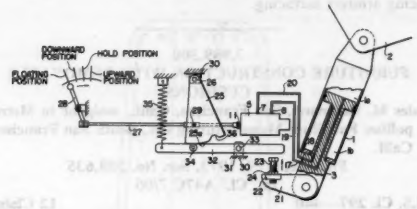
a lower end of said second support member and a rearward end of said first support member meeting in unattached relationship at at least one common interface, forming an acute angle with respect to the planes of each of said first and second support members, and positioned with respect to said engaged first and second retaining members to prevent removal of said back cushion upon pivoting thereof at said interface toward said seat cushion, and

releasable fastening means solely securing said first support member to said bottom frame and solely exposed for release beneath said seat cusion whereby said seat and back cushions can be removed upon release of only said releasable fastening means.

3,989,301
DEVICE FOR ADJUSTING ROTATING ANGLE OF VESSEL OF DUMP TRUCK

Haruhiko Umeda; Hiroshi Ito, both of Yokohama; Tadatoshi Mizuno, Tokyo, and Yoshiaki Harita, Yokohama, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Continuation-in-part of Ser. No. 473,902, May 28, 1974, abandoned. This application Mar. 10, 1975, Ser. No. 557,025
Claims priority, application Japan, Oct. 27, 1973, 48-124097
Int. Cl.² B60P *1/16*
U.S. Cl. 298—22 C **10 Claims**

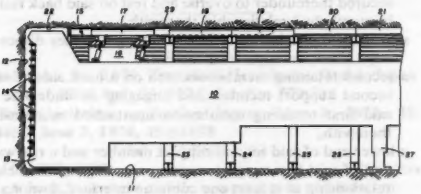


1. A device for adjusting the rotating angle of a vessel of a dump truck, comprising a detent means having a cam portion with a guide recess therein, said detent means being pivotally connected to the vehicle body; a control valve, said detent being connected to a valve spool of said control valve, said control valve being operated by an operating lever connected to said valve spool; a first arm pivotally connected to the vehicle body and having a cam follower thereon, said first arm being urged by a spring to engage said cam follower with the cam portion of said detent means; a second arm fixedly secured to a piston rod of a cylinder for rotating said vessel; and lifting means secured to said second arm for raising said first arm when said cylinder is extended to release the guide recess from the cam follower and allow the cam follower to again engage with the said cam portion.

3,989,302
CONTINUOUS ROOF SUPPORT SYSTEM FOR TUNNEL BORING

Thomas Lonnie Arrington, Beaumont, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed July 25, 1975, Ser. No. 599,194
Int. Cl.² E21D *9/08*
U.S. Cl. 299—11 **4 Claims**



3. A method of tunneling and supporting the roof of a tunnel being bored by a tunneling machine, using sections of lagging and support beams, said tunneling machine having a shield positioned above the machine with space in said shield for sections of lagging, comprising of steps of:

placing sections of said lagging in said space in said shield;

boring a length of tunnel thereby moving said shield and lagging forward in said tunnel;

placing support ring beam means in said tunnel;

moving said lagging from said space in said shield onto said support ring beam means;

placing additional sections of said lagging in said space in said shield;

boring an additional length of tunnel thereby moving said shield and lagging forward in said tunnel;

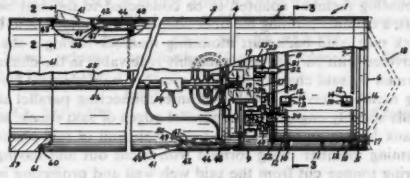
placing additional support ring beam means in said tunnel; and

moving said additional sections of lagging from said space in said shield onto said additional support ring beam means.

3,989,303
TUNNELING MACHINE

Donald H. Akkerman, Brownsdale, Minn. 55918

Filed Dec. 8, 1975, Ser. No. 638,231
Int. Cl.² E21D *9/10*
U.S. Cl. 299—31 **11 Claims**



1. A tunneling machine comprising:

a. a cylindrical open-ended casing normally disposed on a generally horizontal axis;

b. a cylindrical rotor disposed in said casing coaxial therewith and having a front end disposed adjacent one end of the casing and a rear end axially inwardly spaced from the opposite end of the casing;

c. means mounting the rotor for rotation on its axis in the casing and for axial movements relative to the casing;

d. boring means mounted on the front end of said rotor and projecting forwardly of the casing for common movements with the rotor relative to the casing;

e. motor means for imparting rotary movements to the rotor and boring means;

f. advancing and retracting means for imparting axial movements to said rotor element and boring means relative to said casing element;

g. motor mounting means mounting said motor means in said casing for driving engagement with said rotor and for common axial movements with said rotor;

h. a pair of stabilizing fins extending generally longitudinally of said casing and projecting radially with respect to said casing;

i. means mounting said fins on said casing for radial extending and retracting movements relative to said casing;

j. fin projecting means for imparting said radial movements to the fins;

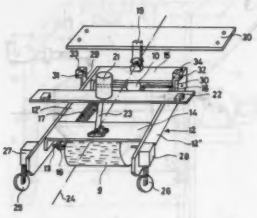
k. and control means for said rotor driving means, feeding means and fin projecting means operable to provide common operating thrust to said motor means and fin projecting means, and independent operating thrust to said advancing and retracting means.

3,989,304

MACHINE FOR CUTTING AWAY ROAD SURFACES

Reinhard Wirtgen, Hohnerstrasse, 5461 Windhagen uber Linz, Rhine, Germany

Filed Feb. 24, 1975, Ser. No. 552,185
Claims priority, application Germany, Mar. 8, 1974, 2411244; Mar. 14, 1974, 2412172
Int. Cl.² E01C 23/12
U.S. Cl. 299—39 6 Claims



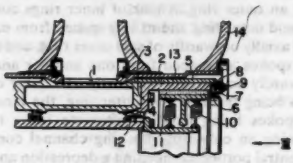
1. A machine for cutting away road surfaces, comprising a preferably self-propelled chassis having an elongated portion extending in the direction of travel and situated above a road surface is to be worked, frame means situated beneath said elongated portion of said chassis between said elongated portion and the road surface, only two suspension means situated one behind the other in the direction of travel and extending between the elongated portion of the chassis and said frame means for suspending the latter from said elongated portion of said chassis, said two suspension means being operatively connected with said frame means to support the latter for free lateral tilting movement about a longitduinal axis extending generally in the direction of travel and situated substantially in a vertical central plane of said chassis, said two suspension means being connected with said elongated portion of said chassis to be carried thereby and one of said suspension means having a universal-joint connection with said frame means to support the latter not only for tilting movement about said longitudinal axis but also for tilting movement about a tranverse axis extending transversely with respect to the direction of travel, and adjusting means operatively connected with the other of the suspension means for raising and lowering the latter so that said frame means can turn about said transverse axis while being raised and lowered and is free to tilt about said longitudinal axis, at least one cutter roller rotatably carried by said frame means and extending downwardly therefrom to engage the road surface so as to work the latter, transmission means carried by said frame means and operatively connected to said cutter roller for transmitting a drive thereto, said transmission means including a gear carried by said frame means, drive means carried by said chassis, and a Cardanic-type shaft connected between said drive means and said gear for transmitting a drive from said drive means to said gear and from the latter through said transmission means to said cutter roller, and a pair of supporting wheels situated on opposite sides of said longitudinal axis and a pair of additional adjusting means carried by said frame means and respectively connected with said supporting wheels to adjust the elevation thereof with respect to said frame means, whereby inclination of said cutting roller with respect to a road surface can be adjusted by said additional pair of adjusting means which adjust the angular position of said frame means and cutting roller with respect to said longitudinal axis while said first-mentioned adjusting means can be actuated to raise the entire frame means and the cutting roller and wheels therewith above the ground surface to a non-working position while said first-mentioned adjusting means can lower the frame means together with the cutting roller to a working position with the depth of cut provided by said cutting roller being determined by said first-mentioned adjusting means.

3,989,305

TIRE RIM AND BRAKE DRUM ARRANGEMENT

Haruhiko Umeda, Yokohama; Katsuyoshi Mori, Tokyo; Hiroyuki Sasaki, and Seiichi Hishinuma, both of Kawasaki, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 13, 1974, Ser. No. 532,396
Claims priority, application Japan, Dec. 14, 1973, 48-141931
Int. Cl.² B60B 23/00
U.S. Cl. 301—6 S 3 Claims



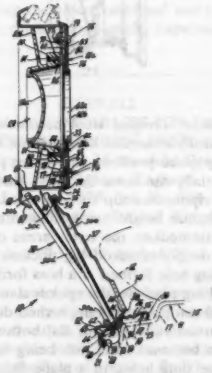
1. In a brake drum arrangement in a wheel of a vehicle, including a brake drum with an inner end face fixedly secured to an outer end face of a wheel hub, an annular rim stopper removably interposed between a tire rim on which a tire of the wheel is mounted and the wheel hub, for retaining the tire rim on the wheel hub, a plurality of wheel clamps for holding said rim stopper in position and a wheel brake positioned within said brake drum, the improvement wherein the outer peripheral surface of the brake drum is aligned with the outer periphery of the wheel hub and said annular rim stopper is mounted around and extending over the entire outer peripheral surface of the brake drum and is held in position by the wheel clamps fixedly secured to an outer end face of the brake drum thereby increasing the diameter of said brake drum to the maximum within a space surrounded by said tire rim so as to enhance the braking efficiency and improving the facility of assembly or disassembly of said arrangement.

3,989,306

WIRE WHEEL SIMULATING WHEEL COVER ASSEMBLY

Herbert Buerger, Walton, N.Y., assignor to Del-Met Corporation, Walton, N.Y.

Filed July 7, 1975, Ser. No. 593,778
Int. Cl.² B60B 7/04
U.S. Cl. 301—37 CM 4 Claims



1. A wire wheel simulating wheel cover assembly comprising a wheel cover having a central portion, and a portion

extending radially outwardly of said central portion, an integrated annular wire basket overlying said radially outwardly extending portion, means forming an outwardly opening annular channel between the central portion and said radially outwardly extending portion of said wheel cover, means to attach said first mentioned means to said central portion of said wheel cover, said basket having a radially inner end projecting into said channel, an axially outwardly extending means at the outer end of said radially outwardly extending portion of said wheel cover, said basket having a radially outer end abutting said axially outwardly extending means, whereby said basket is retained on said wheel cover, said wire basket comprising an outer ring, a pair of inner rings coaxial with respect to said outer ring and axially spaced from each other, and spaced axially outwardly of said outer ring, and a plurality of straight spokes all spaced from one another and inclined radially inwardly and axially outwardly, the outer ends of all said spokes being fixed to said outer ring, the inner ends of alternate spokes being fixed to alternate inner rings, said means forming an outwardly opening channel comprising a cup, said central portion comprising a depression and said cup fitting into said depression, said cup having a bottom wall contacting said central portion, and an axially outwardly extending cylindrical portion extending from said bottom wall, and a radially outwardly extending flange at the axially outer end of said axially outwardly extending portion of said cup, said means to attach said channel forming means to said central portion of said wheel cover comprising a plate within said cup and screw threaded fasteners passing through registering holes in said central portion and in said bottom wall and being screwed into threaded holes in said plate.

3,989,307

STAMPED AUTOMOTIVE WHEEL

Merlyn R. Reppert, Torrance, Calif., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 420,109, Nov. 29, 1973, Pat. No. 3,874,054. This application Jan. 6, 1975, Ser. No. 538,477

Int. Cl.² B60B *1/06*

U.S. Cl. 301—64 R **10 Claims**

1. A one piece stamped steel automotive wheel center having an upwardly extended hub portion, a plurality of outward-spreading spoke portions, and a rim portion; the metal having substantially the same thickness throughout and with a substantially ripple-free top surface; the ratio of the center diameter to the hub height being substantially 5; the center having slots intermediate the outer areas of the spokes; the center having deeply recessed lug pockets intermediate the spokes with a lug hole formed in a boss formed at the bottom of each of said lug pockets, the spokes slanting from the hub to the rim; said rim portion being turned down; the terminus of the downturned rim portion, the bottoms of the lug recesses, and the bottom of the hub being in substantially the same plane; the slots being in a plane intermediate top and bottom of the hub; and said center having a top surface sufficiently polished to permit nickel and chromium electroplating.

3,989,308

WEIGHING APPARATUS FOR PNEUMATIC CONVEYING INSTALLATIONS

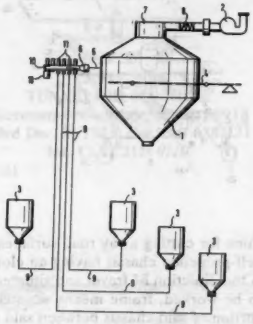
Adolf Zimmermann; Otmar Link, and Josef Theierl, all of Osterburken, Germany, assignors to AZO-Maschinenfabrik Adolf Zimmermann, Germany

Filed Nov. 26, 1974, Ser. No. 527,228

Claims priority, application Germany, Dec. 8, 1973, 2361279

Int. Cl.² B65G *53/24*

U.S. Cl. 302—3 **6 Claims**



1. Weighing apparatus wherein various components to be weighed, which are in powder form, are adapted to be conveyed from two or more supply containers with a suction method into a single weighing container with separator, and shutoff valves are provided in component conduits between the supply containers and the weighing container at a spacing from the weighing container which forms paths of flow of equal length between the shutoff valves and the weighing container, the shutoff valves of all the component conduits being arranged directly adjacent one another in a common block and near the weighing and separating container, to which there are connected on the one hand the component conduits which lead to the shutoff valves and on the other hand a common outlet conduit leading to the weighing container, wherein an air supply valve is arranged upstream of the shutoff valves and between the air supply valve and the shutoff valves there is arranged a secondary air valve for fine dosaging.

3,989,309

APPARATUS FOR THE DISTRIBUTION OF LOOSE FIBROUS MATERIAL

George Patrick Preston, Stirling, Scotland, assignor to Imperial Group Limited, London, England

Continuation of Ser. No. 464,231, April 25, 1974, abandoned. This application Nov. 11, 1975, Ser. No. 630,905

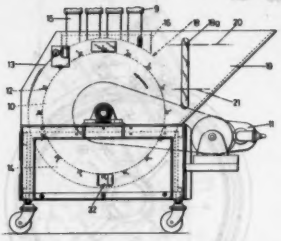
Claims priority, application United Kingdom, Apr. 28, 1973, 20295/73

Int. Cl.² B65G *53/46*

U.S. Cl. 302—13 **6 Claims**

1. Apparatus for the distribution of loose fibrous material comprising a cylindrical drum rotatable about a horizontal axis and provided with an external series of raised rakes, each of said rakes extending longitudinally along the surface of the drum, the rakes being spaced apart circumferentially to provide a space therebetween in which a carpet of the loose fibrous material is formed into a carpet of substantially uniform depth and a cylindrical housing which surrounds the drum and has an inlet through which the material can be deposited on the drum, wherein the inlet is so located that material supplied to it is deposited on an ascending portion of the rotating drum and a top portion of the housing has at least two outlets for the removal by suction of material deposited

on the drum, said housing forming with the drum an annular space which opens into said inlet and is closed between the inlet and said outlets, said drum with said rakes constituting means for carrying material not so removed on the drum through the housing for re-presentation first to the inlet at which deficiencies in the carpet are made up by additional material from the said inlet, and then to the outlets, a hopper



located above said inlet and including means for holding a supply of fibrous material up to a given level to develop a head of fibrous material, said hopper opening downwardly directly into said inlet such that the head of fibrous material in the hopper causes the fibrous material to be gravity fed from the hopper directly into the ascending portion of the drum in the path of the ascending rakes thereof.

3,989,310

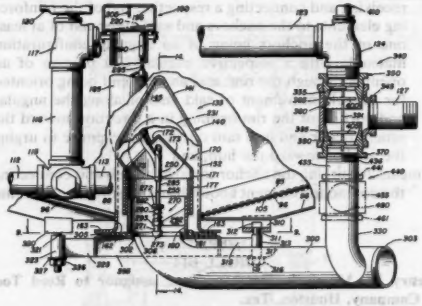
PROPORTIONING DEVICE

Edmund R. Aller, Portage, Ind., assignor to General American Transportation Corporation, Chicago, Ill.

Filed Feb. 10, 1972, Ser. No. 225,244

Int. Cl.² B65G *53/66*

U.S. Cl. 302—53 **11 Claims**



1. In a sealable chamber for unloading pulverulent material from a bulk transport system, the improvement comprising a fluid inlet conduit having one terminal end in communication with the chamber for transmitting fluid into the chamber for fluidizing the pulverulent material therein, a fluid outlet conduit having one terminal end in communication with the chamber for transmitting fluidized solids therefrom, a fluid proportioning device in communication with the other terminal end of said fluid inlet conduit and with said fluid outlet conduit, said proportioning device being adapted to be connected to a source of fluid for supplying fluid to said fluid inlet conduit and said fluid outlet conduit, biasing means operatively connected to said fluid proportioning device for adjusting the proportion of fluid admitted to said fluid inlet conduit and said fluid outlet conduit, said fluid proportioning device being responsive to said biasing means and to the fluid pressure in said fluid inlet conduit and said fluid outlet conduit for automatically proportioning the fluid from the fluid source into said fluid inlet conduit and said fluid outlet conduit respectively to maintain a predetermined ratio between the fluid pressures in said fluid inlet conduit and said fluid outlet conduit.

3,989,311

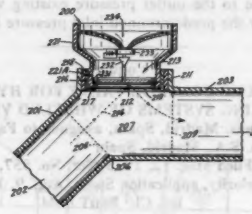
PARTICLE MONITORING APPARATUS

Robert J. Debrey, 4502 Browndale Ave., Edwina, Minn. 55424

Continuation-in-part of Ser. No. 37,157, May 14, 1970, Pat. No. 3,674,316. This application June 30, 1972, Ser. No. 268,020

Int. Cl.² B65G *53/66*

U.S. Cl. 302—65 **17 Claims**



1. An apparatus for sensing materials moving with a flowing fluid comprising: housing means having a wall surrounding a chamber, an inlet passage means connected to the chamber and an outlet passage means connected to the chamber, said outlet passage means being angularly disposed with respect to the inlet passage means for carrying moving fluid and particles entrained in the fluid, said wall having an opening in longitudinal communication with the inlet passage, particle sensing means mounted on said housing means, said particle sensing means having first means located in said opening of the wall and closing said opening without projecting into said chamber, said first means including a member in general longitudinal alignment with the inlet passage means upon which substantially all of the particles moving through the chamber impinge and thereby produce a mechanical signal, barrier means located adjacent the first means to limit the size of particle that can impinge on the first means, second means cooperating with said first means to pick up the mechanical signal and transform said mechanical signal to an electrical signal, output means for receiving the electrical signal and producing readable information related to particle impaction on the first means.

3,989,312

CONTROL VALVE ASSEMBLIES FOR USE IN FLUID PRESSURE BRAKING SYSTEMS

Hartmut Unterberg, Koblenz-Metternich, Germany, assignor to Girling Limited, Birmingham, England

Filed June 13, 1975, Ser. No. 586,603

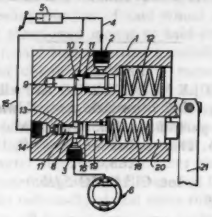
Claims priority, application United Kingdom, June 27, 1974, 28674/74

Int. Cl.² B60T *8/18, 8/26*

U.S. Cl. 303—6 C **11 Claims**

1. A pressure control valve assembly for use in a fluid pressure operated vehicle braking system, comprising a housing having an inlet and outlet; a normally-open valve having a valve member movable in response to a predetermined inlet pressure to control the flow of pressure fluid between the inlet and the outlet; a pressure responsive means; and a biasing means subjecting said pressure responsive means to a biasing force in dependence upon loading of said vehicle; said pres-

sure responsive means being operable in response to both the inlet pressure and said biasing force to reduce the outlet pressure relative to the outlet pressure existing when the valve closes, after the predetermined inlet pressure is attained.

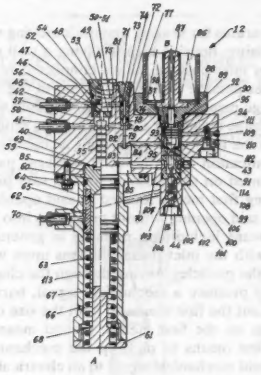


3,989,313

PRESSURE CONTROL VALVE FOR HYDRAULIC BRAKING SYSTEMS OF WHEELED VEHICLES

Peter E. Toms, Madrid, Spain, assignor to Fabrica Espanola Magnetos, S.A., Madrid, Spain

Filed Mar. 12, 1975, Ser. No. 557,488
Claims priority, application Spain, Aug. 9, 1974, 429,133
Int. Cl.² B60T *8/04*
U.S. Cl. 303—21 F **10 Claims**



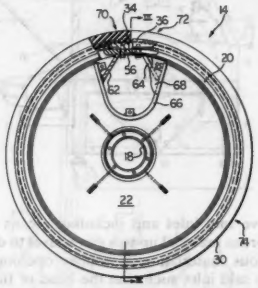
1. A pressure control valve applicable to anti-skid devices in automobile vehicles, said valve comprising first and second hydraulically independent fluid circuit means, said first circuit means including brake circuit fluid for controlling actuation of vehicle's brakes, said second circuit means including control fluid for controlling braking effect of the vehicle's wheels to avoid skidding of the vehicle, first piston means associated with said first circuit means for main actuation of said control valve, second piston means associated with said second circuit means to serve as an intermediary between said control fluid and a spring, said spring being disposed in said control valve against said second piston means to accumulate energy when compressed by said second piston means to provide a differential unit, valve means being provided in said control valve for connecting a conventional brake circuit of the vehicle to an anti-skid system of the vehicle, said differential unit coacting on said first piston means to provide axial movements of said first and second piston means for compressing and decompressing said brake circuit fluid and for opening and closing said valve means, whereby said first and second circuit means are related through functions of said first and second piston means.

3,989,314

WHEEL OF TRACK ASSEMBLY OF A CRAWLER TYPE VEHICLE

Harold L. Reinsma, Dunlap; Robert D. McFeeters, Washington, and Terry D. Linne, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 24, 1975, Ser. No. 634,564
Int. Cl.² B62D *55/14*
U.S. Cl. 305—28 **10 Claims**



1. In an improved wheel of a track assembly of a crawler type vehicle, said wheel having a hub, a rim having inner and outer surfaces, and panels connecting the hub to the rim, the improvement comprising:

an elongated, resilient contacting element having a plurality of reinforcing elements fixedly connected thereto, said contacting element being of a size sufficient for circumferentially extending substantially completely about the outer surface of the rim;

first and second anchors each having a first surface and outer ends, said first surface having a plurality of grooves receiving and connecting a respective end of the reinforcing elements to the anchors and said outer end of at least one of the anchors being of an angular configuration mateable with a respective angular end portion of an opening through the rim, said angular end being oriented for slidable movement of said anchor along the angular end portion of the rim opening in a direction toward the other anchor and into said opening in response to urging the anchor toward the hub; and

means for urging the anchor toward the hub and connecting the contacting element about the outer surface of the rim.

3,989,315

DRILL BIT

Henry W. Murdoch, Houston, Tex., assignor to Reed Tool Company, Houston, Tex.

Filed Aug. 14, 1975, Ser. No. 604,627
Int. Cl.² F16C *19/00*
U.S. Cl. 308—8.2 **5 Claims**

1. A drill bit comprising

a body,

a lubrication system defined within said body,

said body including a journal,

a roller cutter,

said journal and said roller cutter defining a ball race,

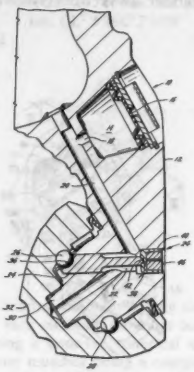
ball bearing means rotationally mounting said roller cutter on said journal and including a plurality of balls positioned in said ball race,

a ball loading hole extending through said body and communicating with said ball race,

a ball retainer positioned in said ball loading hole, and

means for mechanically closing the outer end of said ball loading hole and for retaining said ball retainer in its desired position within said ball loading hole, including

a plug assembly positioned within the outer portion of said ball loading hole and having a plug and means for mechanically expanding said plug into a secured, sealed engagement within the outer end of said ball loading hole,



said plug interconnecting with said ball retainer to retain said ball retainer in its desired position within said ball loading hole.

3,989,316

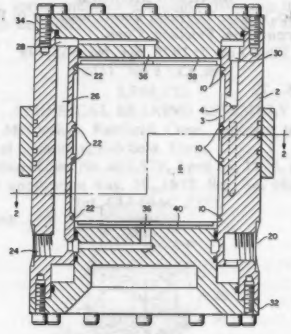
HYDROSTATIC SUSPENSION SYSTEM FOR A CYLINDRICAL MASS

Frank Woodruff, New Hartford, N.Y., assignor to The Bendix Corporation, Teterboro, N.J.

Filed June 24, 1975, Ser. No. 589,818

Int. Cl.² F16C *17/16*

U.S. Cl. 308—9 **9 Claims**



1. A hydrostatic system for supporting a cylindrical mass within a bore of a housing, the diameter of the bore being slightly larger than the diameter of the cylindrical mass, comprising:

a plurality of recesses disposed longitudinally along the bore and bounded by straight and arcuate lands in cooperative relation therewith for providing hydrostatic bearing recesses;

means for supplying the hydrostatic bearing recesses with a flow of a pressurized viscous fluid including;

an inlet port for receiving the fluid, an annular manifold chamber, a longitudinally extending passage communicating with the inlet port and the manifold chamber, and the pressurized fluid flowing through the inlet port and through the longitudinally extending passage, and flowing therefrom to the bearing recesses; and

means for restricting the fluid flow to the bearing recesses for radially supporting the mass within the bore.

3,989,317

OBJECTIVE LENS SYSTEM

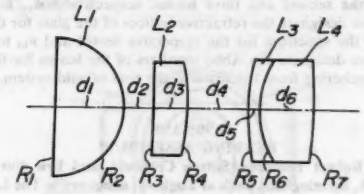
Haruo Maeda, Fuchu, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 12, 1975, Ser. No. 549,457

Claims priority, application Japan, Feb. 21, 1974, 49-20688

Int. Cl.² G02B *9/12*

U.S. Cl. 350—229 **4 Claims**



1. An objective lens system comprising three airspaced lens components which are optically aligned with each other and arranged in succession from the object side of the system, the first two lens components being positive singlets, respectively, and the third lens component being a positive doublet, and said system satisfying the following three conditions, i.e.,

$$0.9f<d_2+d_3+d_4<1.3f \quad (1)$$

$$0.8f<R_4<1.2f \quad (2)$$

$$\left.\begin{array}{l} 1.46<n_{1d}<1.65 \\ 1.46<n_{2d}<1.65 \\ 1.46<n_{4d}<1.65 \\ 50<\nu_{1d}<68 \\ 50<\nu_{2d}<68 \\ 50<\nu_{4d}<68 \\ \nu_{3d}<35 \end{array}\right\} \quad (3)$$

wherein f designates the overall focal length of the system given for a wave length light of 6328 A, R_4 designates the radius of curvature of the cemented surface of the third lens component, d_2 and d_4 designate the separation between the first and second lens components and the separation between the second and third lens components, respectively, d_3 designates the axial thickness of the second lens component, n_{1d}, n_{2d} and n_{4d} designate the refractive indices of the first, second and fourth lenses for the d line, respectively, and ν_{1d}, ν_{2d}, ν_{3d} and ν_{4d} designate the Abbe numbers of the first, second, third and fourth lenses for the d line, respectively, the objective lens system being constructed according to the following constructional data:

Lens	Radii	Thicknesses and separations	n_d	ν_d
	R_1 ∞			
L_1	R_2 −0.6053	d_1 0.6376	n_{1d} 1.51633	ν_{1d} 64.1
		d_2 0.2623		
	R_3 ∞			
L_2	R_4 −1.7969	d_3 0.3195	n_{2d} 1.51633	ν_{2d} 64.1
		d_4 0.5483		
	R_5 2.0655			
L_3	R_6 0.8774	d_5 0.1074	n_{3d} 1.74077	ν_{3d} 27.8
L_4	R_7 −4.5120	d_6 0.4897	n_{4d} 1.51633	ν_{4d} 64.1

wherein R_1 to R_7 inclusive designate the lens curvatures, d_1, d_3, d_5 and d_6 designate the axial thicknesses of the first, second, third and fourth lenses, respectively, d_2 and d_4 designate the space between the first and second lenses and the space between the second and third lenses, respectively, n_{1d} to n_{4d} inclusive designate the refractive indices of the glass for the d line of the spectrum for the respective lenses and ν_{1d} to ν_{4d} inclusive designate the Abbe numbers of the lenses for the d line numbering from the front to the rear of said system.

3,989,318
BEARING ASSEMBLY

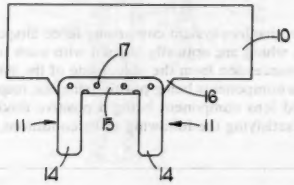
David Robert Yeomans, Sutton Coldfield, and Eric Norman Cook, Birmingham, both of England, assignors to The Lucas Electrical Company Limited, Birmingham, England

Filed July 1, 1975, Ser. No. 592,234

Claims priority, application United Kingdom, July 9, 1974, 30312/74

Int. Cl.² F16C *35/00*

U.S. Cl. 308—30 **4 Claims**



1. A bearing assembly for rotatably supporting a member for rotation about a shaft, said bearing assembly comprising a bearing adapted to be rotatably mounted on the shaft, a sleeve into which said bearing is fitted, and a pair of mounting brackets secured to said member, said mounting brackets being secured to said sleeve and being elongated so that they embrace diametrically opposite portions of said sleeve.

3,989,319
SHAFT-SUPPORTING BEARING

Michel P. Vilcot, Saint-Germain-sur-Morin, France, assignor to Societe Anonyme: Poclain, Le Plessis-Belleville, France

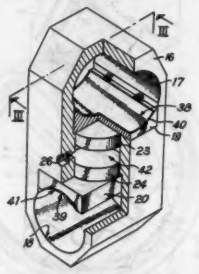
Filed July 1, 1975, Ser. No. 592,213

Claims priority, application France, July 19, 1974, 74.25269

Int. Cl.² F16C *23/10*

U.S. Cl. 308—58 **5 Claims**

1. A bearing allowing pivotal assembly of a shaft, comprising a bearing body including two opposed half bearing sections defining therebetween a bore for receiving a shaft, said first half-bearing section being fixed in the bearing body, said second half-bearing section being mounted to slide in said body in a direction towards and away from the first half bearing section between a first position wherein the second half bearing section cooperates with the first half bearing section to define a bore therebetween to hold a shaft and a second position located further away from said first half bearing section than said first position, and means for biasing said second half-bearing section into said first position to hold the shaft between said half-bearing sections and a friction lining on said second half bearing section for frictionally engaging the shaft when the second half bearing section is in said first position.



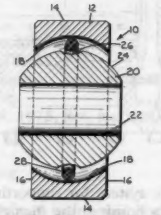
3,989,320
SELF-ALIGNING BEARING WITH PRELOADING BRAKING MEMBER

Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Corporation, Fairfield, Conn.

Filed Apr. 7, 1975, Ser. No. 565,799

Int. Cl.² F16C *1/24*

U.S. Cl. 308—72 **6 Claims**



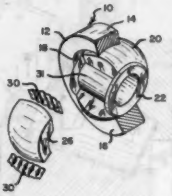
1. A self-aligning bearing comprising an outer member and an inner member disposed in and supported by said outer member, said outer member having a concave inner surface in bearing contact with the convex outer surface of said inner member, an annular groove provided on one of said surfaces, a resilient preloading braking member filling said annular groove, said resilient member being in a substantially compressed state against said members to exert a preloading braking force on said inner and outer members.

3,989,321

SPHERICAL BEARING ASSEMBLY WITH SPRING BIASED SEGMENTED INNER RACE MEMBER

Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Corporation, Fairfield, Conn.

Filed Nov. 25, 1974, Ser. No. 526,513
Int. Cl.² F16C *23/04*
U.S. Cl. 308—72 4 Claims



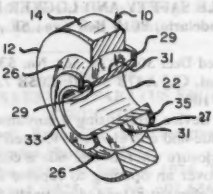
1. A spherical bearing assembly having an inner race member and an outer race member, the inner surface of the outer race member being a concave spherical surface, the outer surface of the inner member being a complementary convex spherical surface, the inner member including a spool member having two annular lips at each end thereof and at least three axially segmented spherical segments interlocked by said annular lips in an axial direction on the spool member, the spherical segments having outer curved spherical faces for abutting the inner concave spherical surface of the outer race member and having inner curved surfaces for positioning near an outer surface of the spool member, and the spherical segments having radially extending faces interconnecting the outer curved spherical faces and the inner curved surfaces, a gap provided between at least two opposite adjacent radially extending faces of said spherical segments, a spring member segment interposed between said opposite adjacent radially extending faces of said segments in the area defined by said gap to axially bias and preload said segments against each other, the spring member extending from the inner curved surfaces to the outer curved spherical faces of the spherical segments.

3,989,322

SPHERICAL BEARING ASSEMBLY

Albert R. McCloskey, Fairfield, Conn., assignor to The Heim Universal Company, Fairfield, Conn.

Continuation of Ser. No. 464,578, April 26, 1974, abandoned. This application Aug. 20, 1975, Ser. No. 606,263
Int. Cl.² F16C *23/02*
U.S. Cl. 308—72 3 Claims



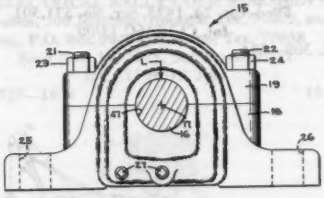
1. A spherical bearing assembly having an inner race member and an outer race member, the inner surface of the outer race member being a concave spherical surface, the outer surface of the inner member being a complementary convex spherical surface, the inner member including a spool member having first and second threaded portions disposed on its outer surface at each end thereof and a smooth truncated conical section interposed therebetween, at least three spherical segments, each segment having a conical portion on its inner surface complementary to the truncated conical section on the outer surface of the spool member, the conical portions of the segments directly contacting the conical outer surface of the spool member, first and second internally threaded annular rings adapted to be threaded on each end of the spool member in meshing relationship with the first and second threaded portions on each end of the spool member respectively, the segments disposed on and interlocked with the spool member by the annular rings, whereby the conical section, the conical portions, and the rings are concurrently used to adjust spaces between adjacent segments, between the inner and outer members, and between the segments and the spool.

3,989,323

COMPOSITE BEARING ASSEMBLIES

Roy E. Lambert, Englewood, Fla., assignor to FMC Corporation, San Jose, Calif.

Filed May 12, 1975, Ser. No. 576,763
Int. Cl.² F16C *13/00*
U.S. Cl. 308—74 14 Claims



1. A composite bearing assembly for an elongated shaft to which a load is applied in a predetermined direction transversely of the shaft, said bearing assembly comprising a load supporting segment that is made of a good bearing material, said load supporting segment being positioned transversely of the shaft on a shaft side opposite from the application of the load thereto for supporting both the shaft and the load, and a shaft retaining segment being made of a material different than the load supporting segment and being positioned transversely of the shaft at a location that is opposite from the load supporting segment for holding the shaft in place between the segments.

3,989,324

ROLLING CONTACT BEARINGS

Earl W. Traut, P.O. Box 23776, Fort Lauderdale, Fla. 33307

Filed Oct. 2, 1974, Ser. No. 511,237
Int. Cl.² F16C *19/20*
U.S. Cl. 308—200 12 Claims

1. A rolling contact bearing comprising:

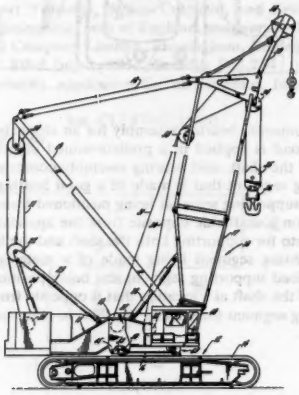
only three bearing races,
said bearing races being circular and coaxially disposed,
two of said bearing races being joined to each other,
only two series of rotating balls,
said two series of rotating balls each including an equal plurality of balls,
the balls of the first of said series being alternately interposed between and in rolling contact with the balls of the second of said series,
said first series of balls being in rolling contact with one of said joined bearing races, said third bearing race, and said second series of balls, each ball of said first series having only four points of contact,
said second series of balls being in rolling contact with the other of said joined races and with said first series of balls, each ball of said second series having only three points of contact.

3,989,325

ROTATABLE BED AND ROLLER ASSEMBLY

James G. Morrow, Sr.; David J. Pech, and Terry W. Kleppe, all of Manitowoc, Wis., assignors to The Manitowoc Company, Inc., Manitowoc, Wis.

Filed Apr. 24, 1975, Ser. No. 571,301
Int. Cl.[2] F16C *13/00*
U.S. Cl. 308—204 5 Claims



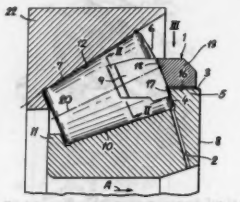
1. A rotatable bed and roller assembly for a load handling device having a base with a ring gear and roller path thereon comprising, in combination, a weldment having a horizontal web portion with a vertical shaft opening adapted to be aligned with the axis of said ring gear and side frames extending fore and aft of said axis, an integral jaw member depending from each side frame aft of said axis, means including an arcuate beam detachably connected to said jaw members for journalling a plurality of rear hook rollers adapted to roll on the underside of a horizontal flange on said roller path and front and rear roller assemblies for rotatably supporting said weldment on said roller path, the ends of said arcuate beam each being slidably carried on a link spanning each of said jaw members, and means for adjusting said arcuate beam fore and aft so as to position said hook rollers with respect to said flange.

3,989,326

TAPERED-ROLLER BEARING WITH MASSIVE CAGE

Karl Hörmann, Dittelbrunn, and Hans Köber, Schwebheim, both of Germany, assignors to Kugelfischer Georg Schäfer & Co., Schweinfurt, Germany

Filed May 15, 1975, Ser. No. 577,672
Int. Cl.[2] F16C *33/00*
U.S. Cl. 308—218 5 Claims



1. A high-speed roller bearing comprising:
an annular outer race centered on an axis;
an annular inner race concentrically within said outer race and formed with a radially outwardly projecting ridge having an axially extending face and a radially extending face;
an array of like tapered rollers between said races and having ends lying against said radially extending face; and
a unitary comblike cage of highly rigid metallic material between said races and having an annular main body formed unitarily with an inner surface coaxially surrounding and guided by said axially extending face of said ridge, respective surfaces lying against and guided by said ends of said rollers, and a plurality of elongated spacer elements unitary with said body and separated by said surfaces, said spacer elements extending axially from said body between said rollers, each spacer element having a circumferentially enlarged head at a free end turned away from said body and being formed with an inwardly projecting ledge overreaching and engaging axially against said radially extending face of said ridge, said elements having the same strength with respect to centrifugal acceleration forces, said inner race being formed with a radially outwardly opening groove at least partially defined by said ridge and having a frustoconical base surface on which said rollers lie.

3,989,327

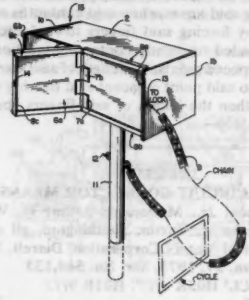
CYCLE SAFETY AND LOCKER DEVICE

Arthur R. Candelaria, 8019 Bell Ave., SE., Albuquerque, N. Mex. 87108

Filed Dec. 30, 1974, Ser. No. 537,418
Int. Cl.[2] A47B *81/00*; E05B *73/00*
U.S. Cl. 312—100 1 Claim

1. A locker device comprising a container composed of a top, bottom, side and end elements located in spaced relation to form an enclosure wherein one side is comprised of at least one door to cover an opening to receive articles of varying size, a support element extended vertically from the locker, a locking means, one end of which is securely fixed to the support element and the other end of which is received by the locker and attached thereto by a lock mechanism, with the locking means being affixed to the support by an anchor where the door and end portion corresponding thereto contain openings which cooperate with the lock mechanism and other end of the locking means, a re-enforcement plate located at the junction of container and the support means, and a center plate dividing the container compartment into two

separate areas wherein angle elements are located along the periphery of the door as well as the periphery of the end, top and bottom of the locker which form the opening that the door covers.



3,989,328

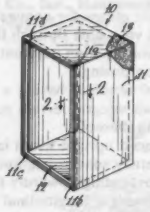
REFRIGERATOR CABINET CONSTRUCTION

Clyde Joseph Nonomaque, and Vernon Paul Rolland, both of Fort Smith, Ark., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed May 2, 1975, Ser. No. 574,249

Int. Cl.² A47B *81/00*; F25B *11/00*

U.S. Cl. 312—214 **14 Claims**



1. In a refrigeration appliance cabinet having an outer shell and an inner liner cooperatively defining an insulation space therebetween having a front opening, means for centering said liner in accurately spaced relationship within said cabinet shell comprising a strip of rigid foam effectively closing said front opening, and foamed-in-place insulation in said insulation space, said strip further comprising foam stop means for preventing passage of foam outwardly through said front opening during foaming-in-place of said insulation.

3,989,329

REFRIGERATION APPARATUS ENCLOSURE STRUCTURE

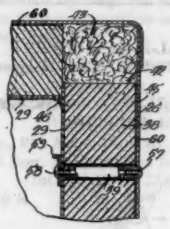
Arthur E. Benford, Evansville, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Division of Ser. No. 433,071, Jan. 14, 1974. This application Aug. 4, 1975, Ser. No. 601,636

Int. Cl.² B65D *25/14*; F25D *23/06*

U.S. Cl. 312—214 **9 Claims**

1. In a refrigeration apparatus enclosure having an outer cabinet having walls defining a corner, an improved corner construction comprising: inner laminate wall means within said outer cabinet defined by an inner sheet liner and outer insulation extending between said inner sheet liner and said outer cabinet, said inner laminate wall means having an intersecting corner portion wherein the inner sheet liner portions are in overlapping abutment adjacent said corner of said outer cabinet, said corner portion defining a void outwardly of said inner sheet liner portions and inwardly of said outer cabinet corner; and foamed-in-place insulation means filling said void and contacting said outer cabinet corner and at least one portion of said inner sheet liner.



3,989,330

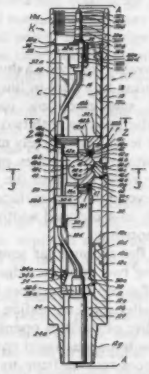
ELECTRICAL KELLY COCK ASSEMBLY

Roy H. Cullen, 500 Jefferson, Houston, Tex. 77002, and David E. Young, P.O. Box 58408, Houston, Tex. 77058

Filed Nov. 10, 1975, Ser. No. 630,441

Int. Cl.² H01R *3/04*

U.S. Cl. 339—16 R **15 Claims**



1. A kelly cock apparatus adapted for connection in a tubular drill string above or below a kelly joint of said tubular drill string, said tubular drill string being provided with one or more sections of an electrical cable interconnected therethrough for the transfer of electrical energy between a location substantially at the surface and a subsurface location in a well, said apparatus comprising:

a tubular body having a longitudinal bore therethrough and also having connector means at each end for connecting the tubular body with adjoining tubular members within said tubular drill string;

fluid flow control means mounted within the tubular body for controlling the flow of fluids through said bore;

electrical conductor means extending within and longitudinally of the tubular body and having electrical terminal connector means at each end substantially adjacent the tubular body connector means for detachable interconnection with electrical cable sections provided with adjoining tubular members of the drill string for transmitting electrical energy therethrough; and

means for positioning said electrical conductor means in said tubular body separately from said fluid flow control

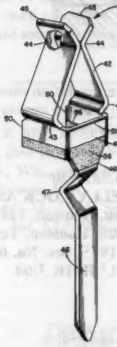
means so as to permit control of the flow of fluids through said bore by said fluid flow control means simultaneously with the flow of electrical energy through said conductor means.

3,989,331

DUAL-IN-LINE SOCKET

Richard J. Hanlon, Attleboro, Mass., assignor to Augat, Inc., Attleboro, Mass.

Filed Aug. 21, 1974, Ser. No. 499,217
Int. Cl.² H05K *1/12*
U.S. Cl. 339—17 CF **10 Claims**



1. A socket for removably receiving a dual-in-line electronic package and for mounting to a dual-in-line array of holes in a printed circuit board, said electronic package including a generally flat rectangular housing with two substantially parallel rows of conductive leads respectively extending outwardly from a pair of opposite parallel edges of said housing and turned at substantially right angles to the flat surface of said housing to protrude beyond one flat surface thereof, said leads tapering symmetrically to a reduced width at their respective ends, said socket comprising:

a unitary generally flat rectangular insulator having raised parallel sides along two opposite edges at the top, a central portion with flat bearing surfaces between said parallel sides said parallel sides extending above said bearing surfaces, a plurality of cavities opening into the bottom surface of said insulator, each said cavity having substantially the same cross section from its bottom opening to a point adjacent and spaced from said bearing surfaces, said cavities being arranged in parallel rows adjacent said parallel sides, each of said cavities having a downward facing shoulder along one internal side thereof spaced from said bottom opening, and a plurality of slots through said central portion adjacent said parallel sides and said bearing surfaces, each slot opening into one of said cavities; and

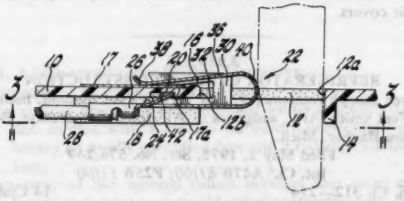
a plurality of contacts, one of said contacts being mounted in each cavity, each of said contacts being formed with a body portion having an upward facing step adapted to abut said shoulder within said cavity thereby forming a positive stop when said contact is mounted within said cavity, said body portion being in an interference fit within the bottom of said cavity, a pair of resilient figures extending upwardly from said body portion into said cavity and positioned beneath said slot, and an elongated lead extending downwardly from said body portion, said fingers of said contact bending outwardly immediately above said body to form oppositely facing knees, and then bending inwardly to a point of normally spaced confronting relationship when outside of said cavity, then bending outwardly at the upper ends to form a tapered opening therebetween wider than the width of said slots, the distance between said knees of said contact being normally greater than the width of said cavity, said knees being forced toward each other by the opposite walls of said cavity engaging said knees when said contact is mounted therein, thereby forcing said fingers toward each other and in a preloaded resiliently contacting relationship at said normally spaced points, the length of said cavity from said shoulder to said point adjacent said bearing surfaces being greater than the length of said fingers above said upward facing step.

3,989,332

PRINTED CIRCUIT CONNECTOR MEANS

Charles A. Patterson, Jr., McDonald; Arthur H. Winyard, Cortland, and John A. Yurtin, Southington, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jan. 27, 1975, Ser. No. 544,133
Int. Cl.² H05K *1/07*; H01R *9/12*
U.S. Cl. 339—17 C **3 Claims**



1. Electrical connector means for connecting an electrical lead to a printed circuit via a hole through the printed circuit board spaced wholly inwardly from adjacent side edges of the printed circuit board comprising:

a unitary sheet metal terminal having a generally planar body portion and an integral ferrule portion contiguous with a rearward end thereof,

a pair of laterally spaced upright wings integrally attached respectively to laterally spaced longitudinal sides of said body portion and extending upwardly therefrom,

each of said wings having a longitudinal slot which opens rearwardly and extending substantially the length of the wing, said slots being in mutual lateral alignment for receiving portions of a printed circuit board adjacent a hole therethrough spaced wholly inwardly from the side edges thereof,

a generally planar resilient tongue portion disposed between said wings and converging rearwardly toward said body portion for biasingly engaging a conductor strip on an upper surface of the printed circuit board adjacent said hole when the portions of said printed circuit board are operatively disposed in said slots, said flexible tongue having an upwardly flared rearward end portion for guidance onto the conductor strip portion, and

a U-shaped nose portion connecting said tongue portion to said body portion and protruding forwardly of said wings for pushing said terminal into firmly seated engagement with portions of the printed circuit board received in said slots.

3,989,333

CABLE TELEVISION TAP CONNECTOR BOX

Jack D. Cauldwell, Centerville, Ohio, assignor to Arvin Industries, Inc., Columbus, Ind.

Filed Dec. 18, 1975, Ser. No. 641,957
Int. Cl.² H05K *1/10*; H01R *13/46, 17/20*
U.S. Cl. 339—17 C **3 Claims**

1. A connector for seizing and electrically contacting a conductor comprising:

a first cover shell,

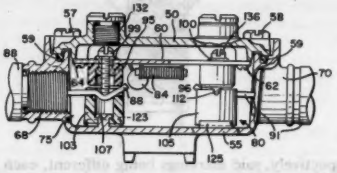
a second cover shell secured to said first cover shell and defining a conductor admitting opening,

a first insulating annulus mounted on said first cover shell,

a second insulating annulus mounted on said second cover shell,

open ended slot means defined by said second insulating annulus for positioning an electrical conductor, said second insulating annulus being positioned adjacent said first insulating annulus such that a conductor in said open ended slot means is held therein by said first insulating annulus, and

electrical contact means mounted centrally in said first insulating annulus to be movable along the central axis of said first insulating annulus to contact electrically said conductor.

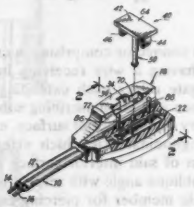


3,989,334

EXTENSION CORD TERMINAL WITH SAFETY CLOSURES

Samuel S. Fortino, Huntington, N.Y., assignor to Gem Electric Manufacturing Co., Inc., Hauppauge, N.Y.

Filed May 14, 1975, Ser. No. 577,222
Int. Cl.² H01R 13/44
U.S. Cl. 339—41 **5 Claims**



1. In combination:

a. a cord conductor having at least two insulated conductor strands; and

b. an electrical terminal comprising:

i. a body of dielectric material having at least one face with at least one pair of spaced terminal openings therein adapted to receive the prongs of a plug;

ii. a pair of female electrical contacts in said body slideably engageable with said prongs, each of said pair of female electrical contacts being in permanent electrical connection with an associated conductor strand in said cord conductor;

iii. a strip of dielectric material associated with said pair of terminal openings;

iv. means for mounting said strip on said body between said pair of terminal openings said mounting means permitting rotational movement of said strip relative to said body between a first position wherein it exposes said pair of terminal openings for reception of said prongs and a second position wherein it blocks said openings, said mounting means permitting limited movement of said strip toward and away from said face, said rotational movement being independent of said limited movement toward and away from said face; and

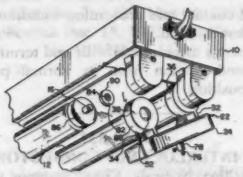
v. a pair of spaced tabs extending at right angles from said strip, said spaced tabs adapted to frictionally enter said pair of terminal openings and seal the same when said strip is in its second position and said strip is moved toward said face.

3,989,335

POWER TAKE-OFF FOR FLUORESCENT LIGHT FIXTURES

Paul Belokin, Jr., Rte. No. 4, Hayward, Wis. 54843

Filed Sept. 20, 1974, Ser. No. 507,807
Int. Cl.² H01R 33/08
U.S. Cl. 339—50 R **21 Claims**



1. A power take-off unit for a dual tube fluorescent fixture wherein the adjacent ends of the laterally spaced tubes and their associated protruding conductor pins receive electrical power by electrical contact with fixture terminals are used for delivering electrical power to a foreign load, comprising:

an electrically insulated housing member adapted to accommodate said foreign electrical load;

a pair of spaced conductor members having end portions and extending from said housing member with the length of the connection and end portions substantially less than the length of one of said tubes;

each of said conductor end portions including electrically conductive disc portions adapted to detachably engage in electrical contact with said conductor pins at said adjacent ends to utilize voltage differential between the electrical potentials supplied separately to the pins of adjacent tube ends by the generating ends of their ballasts; and

a layer of insulating plastic on at least one side of each disc having a flange portion protectively enclosing the marginal edge portions of the disc and of a diameter approximately that of the end of the tube,

the other ends of said conductor means being connected to said housing for energizing said foreign load.

3,989,336

FLEXIBLE CIRCUIT CONNECTOR ASSEMBLY

Michael Rizzio, Jr., Glendale Heights, and Richard C. Janzow, Palos Heights, both of Ill., assignors to Molex Incorporated, Lisle, Ill.

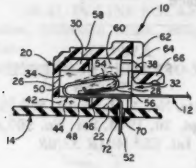
Filed Apr. 28, 1975, Ser. No. 572,263
Int. Cl.² H01R 13/62
U.S. Cl. 339—74 R **14 Claims**

1. A connector assembly for electrically connecting a substantially flat, flexible first circuit element including a flat conductive cable to a second circuit element, said connector assembly comprising:

a housing of insulation material including a terminal receiving cavity formed therein having an opening through which the first circuit element is received into the cavity and a floor over which the first circuit element is supported;

a generally resilient terminal mounted in said cavity, said terminal including opposing, normally spaced apart first and second portions for receiving said first circuit ele-

ment therebetween, said first portion being mounted adjacent said floor and said second portion being movable from its normal position downwardly toward said floor to a contact position to mechanically press the first and second portions against the cable for ensuring good



electrical contact and preventing withdrawal of said first circuit element; and

actuating means associatable with said terminal for moving said second portion from its normal position to the contact position.

3,989,337

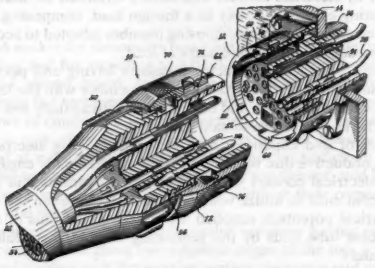
INTERLOCKING CONNECTOR

Richard P. Stelling, Norwalk, Conn., assignor to Burndy Corporation, Norwalk, Conn.

Filed Jan. 2, 1976, Ser. No. 646,222

Int. Cl.² H01R *23/60*

U.S. Cl. 339—90 R **10 Claims**



1. The circular electrical connector of the type wherein one of a pair of inter-engaging members has a revolvable circular outer collar having at least one interior helical groove attached for cooperative inter-engagement with pins affixed to the shell portion of the other of said pair of members to effect removable affixation of said members to each other, comprising

at least one elongating backing strip affixed to and positioned interiorly of said shell portion with at least one of said pins affixed to a main portion of said strip, said strip extending inwardly of said shell from the point of affixation to said strip of said pin, the long axis of said strip being substantially parallel to the axis of the member to which it is affixed, said backing strip being L-shaped at a portion thereof inwardly of said shell portion from said point of affixation.

3,989,338

PUSH-PIN ASSEMBLY METHOD AND CONSTRUCTION

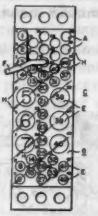
Robert B. Gosser, 104 Del Drive-Linmor Acres, Irwin, Pa. 15642

Filed Nov. 8, 1974, Ser. No. 522,240

Int. Cl.² H01R *13/62*

U.S. Cl. 339—96 **9 Claims**

1. A member having a plurality of holes therein for accepting a plurality of separate push-pins, respectively, and push-pin-penetratable membrane areas bearing hole-identifying markings extending across the aforesaid holes, re-



spectively, said markings being different, each hole with respect to others.

3,989,339

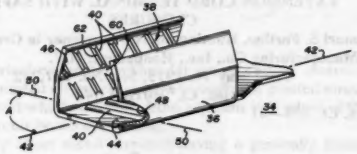
ELECTRICAL CONNECTOR AND METHOD OF MAKING SAME

Louis F. Haitmanek, Florham Park, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Oct. 2, 1975, Ser. No. 618,913

Int. Cl.² H01R *11/20*

U.S. Cl. 339—97 C **13 Claims**



1. An electrical connector comprising: a crimpable metallic ferrule member having a wire receiving interior surface, a plurality of elongate ridges each extending outwardly from said interior surface and circumscribing substantially the entire inner periphery of said interior surface, each of said ridges lying along a longitudinal axis which extends parallel to a respective portion of said interior surface and which is oriented at a given oblique angle with respect to the longitudinal axis of said ferrule member for piercing engagement with a wire inserted therewithin, whereby upon crimping said ferrule member about such wire, each of said ridges is caused to penetrate the periphery of such wire and engage the interior thereof along an obliquely oriented path with respect to the longitudinal axis of such wire, so that such wire is penetrated about its periphery along incrementally displaced transverse planes longitudinally offset from one another to avoid shearing such wire along a common plane.

3,989,340

INSULATOR RAMP CLAMP FOR CONNECTORS

Luther M. Sheldon, Cranston, and Robert E. Maloof, E. Greenwich, both of R.I., assignors to General Electric Company, New York, N.Y.

Filed Apr. 29, 1975, Ser. No. 572,794

Int. Cl.² H01R *13/58*

U.S. Cl. 339—103 C **7 Claims**

1. A cable clamp comprising

a first and a second tubular housing,

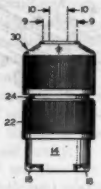
said housings being axially aligned and having external hand grip surfaces to permit opposite rotation thereof,

said housings having a set of cooperating threads to induce axial movement responsive to opposite rotation thereof,

and said housings being adapted to having a cable pass therethrough,

a set of double wedge cable grip cleats positioned within said housings,

ramp means supported on the interior of said first and of said second housing,



said ramp means bearing against and being meshed with said set of double wedge cleats,

an axial movement of said tubular housings inducing radial inward movement of said double wedge cleats,

and said cleats cooperating on inward movement thereof to grip a cable passing therethrough.

3,989,341

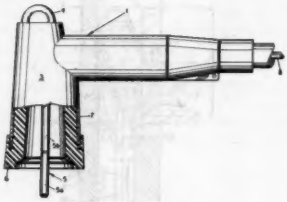
ELECTRIC CONNECTOR APPARATUS AND METHOD

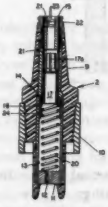
Robert D. Ball, Tucker, Ga., assignor to Kearney-National, Inc., Atlanta, Ga.

Continuation of Ser. No. 512,942, Oct. 7, 1974, abandoned. This application Oct. 6, 1975, Ser. No. 619,957

Int. Cl.² H01R *13/52*

U.S. Cl. 339—111 **5 Claims**





1. Electric connector apparatus comprising support structure including an elongated conducting sleeve having an inwardly projecting shoulder intermediate its ends, an elongated tubular hollow unitary electric contact slidably mounted within said sleeve and having an outwardly projecting flange defining an integral shoulder engageable with said inwardly projecting shoulder of said sleeve to determine a normal position of said contact relative to said sleeve, said unitary contact being movable longitudinally from its normal position to an interim position due to frictional engagement with a cooperating contact during insertion of the cooperating contact into one end of said hollow unitary contact to initiate but not complete a circuit closing operation and without establishing an arc therebetween, spring means arranged to react between a part of said support structure and said unitary contact and energized by movement of said unitary contact toward its interim position for moving said unitary contact longitudinally to its normal position to complete a circuit closing operation when the force exerted by said spring means exceeds the frictional force between said unitary contact and the cooperating contact, and a sleeve contact disposed about said flange and secured thereto and in sliding contact with the part of the inner surface of said conducting sleeve which is adjacent said spring means to form a shunt circuit for diverting a substantial portion of current around said spring.

3,989,342

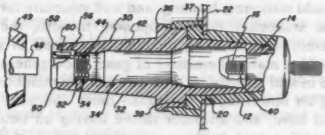
CHAMBERED ARC SNUFFING TUBE FOR BUSHING ASSEMBLY

Allen H. Fischer, Affton, and John S. Schwarz, St. Louis, both of Mo., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Continuation of Ser. No. 361,424, May 18, 1973, abandoned. This application Dec. 15, 1975, Ser. No. 640,973

Int. Cl.² H01R *13/52*

U.S. Cl. 339—111 **6 Claims**



1. A load bread connector comprising, in combination:

a stationary bushing;

a removable terminator; and,

an arc snuffing member insert received within said stationary bushing;

wherein:

said removable terminator comprises a tubular body of insulating material and includes an axial terminator electrode coaxially mounted within the longitudinal bore of said tubular body, said electrode being spaced from the bore walls of said tubular body and said electrode having a tubular arc follower member of arc extinguishing material at its end portion thereof;

said stationary bushing comprises a tubular body of insulating material which is received between the bore walls of said tubular body of said removable terminator and said electrode, said stationary bushing having a mouth opening at one end thereof and a conductive tube disposed within the longitudinal bore of said tubular body of said stationary bushing, for receiving said electrode in conductive relationship therewith, and said conductive tube being spaced a given distance from said mouth; and,

said arc snuffing member is inserted into and fixedly mounted in said mouth of said stationary bushing, said snuffing member comprising an arc extinguishing material and said member including a generally tubular outer surface and an inner tubular bore for receiving the electrode of a terminator, said member including at least one cavity between said inner tubular bore and said tubular outer surface, and a plurality of fixed perforations in said member disposed substantially toward said mouth of said stationary bushing and extending from said inner tubular bore into said cavity wherein said cavity is in communication with said inner tubular bore after the arc is extinguished by said arc extinguishing materials for receiving arc-generated gases from said inner tubular bore during withdrawal of said electrode through said inner tubular bore when said fixed perforations are exposed by the withdrawal of said arc follower member from said inner tubular bore.

5. A load break connector comprising, in combination:

a stationary bushing;
a removable terminator; and,
an arc snuffing member insert received within said stationary bushing;
wherein:
said removable terminator comprises a tubular body of insulating material and includes an axial terminator electrode coaxially mounted within the longitudinal bore of said tubular body, said electrode being spaced from the bore walls of said tubular body and said electrode having a tubular arc follower member of arc extinguishing material at its end portion thereof;
said stationary bushing comprises a tubular body of insulating material which is received between the bore walls of said tubular body of said removable terminator and said electrode, said stationary bushing having a mouth opening at one end thereof and a conductive tube disposed within the longitudinal bore of said tubular body of said stationary bushing, for receiving said electrode in conductive relationship therewith, and said conductive tube being spaced a given distance from said mouth; and,
said arc snuffing member is inserted within said entry opening of said stationary bushing, said snuffing member including an inner bore to communicate with the opening of said stationary bushing, and wall structure for engaging said stationary bushing opening to affix the member therein, said snuffing member comprised of arc extinguishing material emissive of gases upon generation of an arc in said inner bore, and said snuffing member comprising an inner sleeve having an inner dimension defining said bore, and an outer sleeve having an outer surface providing said bushing engaging wall, said sleeves in surface contact along mating walls thereof, at least one annular cavity between said inner and outer sleeves, a first plurality of fixed apertures disposed generally at the entry end of said inner sleeve and extending through said inner sleeve from said inner bore to said cavity wherein said cavity communicates with said inner bore after said arc is extinguished by said gases upon initial movement of said electrode and wherein the communication of said cavity with said inner bore occurs upon further movement of said electrode, a flanged end wall of said snuffing member adapted to rest externally of said stationary bushing when said snuffing member is fully assembled into said stationary bushing, and a second plurality of apertures in said end wall venting said cavity to the atmosphere external to said connector.

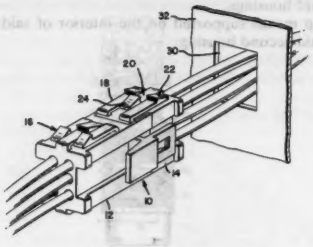
3,989,343

MEANS FOR MOUNTING AN ELECTRICAL CONNECTOR IN A PANEL OPENING FROM EITHER SIDE OF THE PANEL

John Edward Lucius, Harrisburg, and Linn Stephen Lightner, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 27, 1976, Ser. No. 652,675
Int. Cl.² H01R 9/16
U.S. Cl. 339—128 **3 Claims**

1. In combination with an electrical connector assembly comprising first and second connector members, each being matable with the other to thereby engage contact terminals mounted therein with each other, one of said members comprising a plug member having a mating face and the other said member being a receptacle member having a hooded face receiving said first member therein,
mounting means on two opposite sides of each of said members whereby either of said members can be selectively detachably mounted in a profile panel opening,
said mounting means comprising at least three interdigitated, cantilever beam members on each of said opposite sides of said connector members, said beams being interleaved with each other from opposite directions and overlapping the length, each beam having a tail portion integral with said member, a profiled nose at the free end thereof and an outwardly directed profiled step intermediate said nose and said tail, said step of adjacent arms defining therebetween a panel engaging channel extending normal to the axes of said arms.

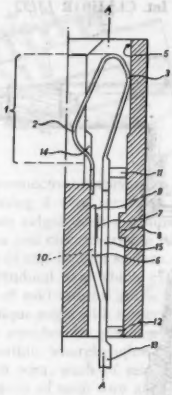


3,989,344

TWO-POSITION CONTACT FOR PRINTED CIRCUIT CARDS

Lucien Pechard, Dole; Bernard Logerot, Mont-sous-Vaudrey, and Jean-Pierre Huguenet, Dole, all of France, assignors to Bunker Ramo Corporation, Oak Brook, Ill.

Filed Dec. 26, 1974, Ser. No. 536,713
Int. Cl.² H01R 13/42, 33/76
U.S. Cl. 339—176 MP **8 Claims**



1. A connector for making electrical connection to an inserted printed circuit card comprising:
a housing having at least one cavity with a pair of opposed bosses on opposite walls of said cavity, said cavity being open at one end and having a printed circuit card opening spaced from one of said walls at the other end; and
a contact member positioned within said cavity and comprising: an elongated shank having a contact end adjacent said printed circuit card opening for making contact with the printed circuit card, and a wiring end extending through said one end of said cavity for joining said contact member to an electrical conductor, said contact end having a flexible loop with a first contact portion on one side of said loop and facing in one direction away from the longitudinal axis of said shank and a second contact portion on the other side of said loop and facing in a direction opposite said one direction, a selected one of said contact portions being in an engagable position adjacent said printed circuit card opening, said second

contact portion being longitudinally spaced from said first contact portion and closer to said wiring end;

releasable spring catch securing means branching from said shank in a transverse direction coinciding with said opposite direction and abutting a selected one of said pair of bosses to secure said contact member longitudinally within said cavity; and

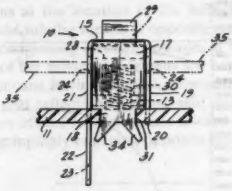
positioning means extending from said shank for positioning and preventing rotation of said contact member within a cavity in a housing, said positioning means comprising at lease one tab longitudinally spaced from said securing means near said contact end of said shank and at least one tab longitudinally spaced from said securing means near said wiring end of said shank, said tabs extending transversely from said shank in said one direction to abut against a wall of said cavity;

whereby said contact member can be secured in said housing in one of two selected positions, a first position with said first contact engagable with the circuit board and a second position rotated 180° about said longitudinal axis with said second contact engagable with the circuit board, thus providing an engagable contact at one of two selected longitudinal locations and a wiring end at a single longitudinal location.

3,989,345
SPRING BINDING POST

Charles P. DeVito, Woodale, Ill., assignor to Chromalloy-Alcon, Inc., Chicago, Ill.

Filed Mar. 14, 1975, Ser. No. 558,543
Int. Cl.² H01R 11/22
U.S. Cl. 339—254 R **5 Claims**



1. In combination, a spring binding post comprising a hollow generally tubular housing having a head end portion and a base end from which a plurality of substantially flat mounting extensions and an electrical terminal extension project, and a supporting panel against which said base end seats, said panel having complementary slots through which said mounting extensions and said terminal extensions engage:

said head end portion having an opening therethrough and an inwardly facing shoulder;

a plunger shorter than the housing and having a head end and a base end and mounted reciprocably within the housing, a head end manipulatable knob projecting from the plunger through said head end opening and a biasing spring thrusting the plunger toward engagement with said shoulder, the housing and the plunger having electric lead-receiving coupling openings which are adapted to be placed in registration by pushing in on the knob of the plunger;

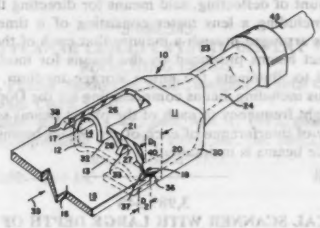
respective pairs of interlock bifurcations extending from the distal ends of said mounting extensions and lying in the flat plane of the respective extension from which they extend;

and said interlock bifurcations of each pair being displaced relative to one another in the respective plane of their mounting extension into locking relation to said supporting panel by engagement against ends of the slots through which the mounting extensions extend.

3,989,346
CONNECTOR HOUSING

Randy Marshall Manning, Millersburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 3, 1975, Ser. No. 628,440
Int. Cl.² H01R 11/04
U.S. Cl. 339—258 S **17 Claims**



1. A connector system comprising:

a male terminal having an insertable portion and a shoulder means;

a female terminal having outer edges defining an opening for receiving said insertable portion of said male terminal; and

housing means constructed to retain said female terminal and comprising outer edges surrounding said opening in said female terminal and extending beyond said opening a predetermined distance;

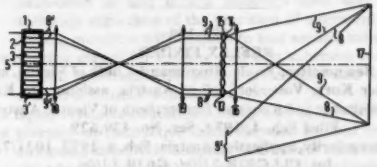
said housing further comprising thin membrane portions extending from the outer edge of said housing to a point back of the outer edges of said female terminal and positioned to mate with the shoulder means of said male terminal;

said thin membrane portions having slits therein in the direction of insertion of said insertable portion of said male terminal into said female terminal to facilitate entry of said shoulder means into said thin membrane portions.

3,989,347
ACOUSTO-OPTICAL DATA INPUT TRANSDUCER WITH OPTICAL DATA STORAGE AND PROCESS FOR OPERATION THEREOF

Hans Eschler, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 17, 1975, Ser. No. 587,732
Claims priority, application Germany, June 20, 1974, 2429612
Int. Cl.² G03H 1/04; G11C 13/04
U.S. Cl. 350—3.5 **10 Claims**



1. In an apparatus for holographically recording data on a storage medium with the data being block-organized holographic data, said apparatus comprising means providing a coherent reference beam and a laser beam having a coherent optical plane wave, means for spatially modulating the laser beam into a plurality of object beams, means for directing the plurality of object beams at a storage medium to interfere with the reference beam to form the holographic recording on the storage medium, the improvements comprising said means for spatially modulating comprising an acousto-optical light de-

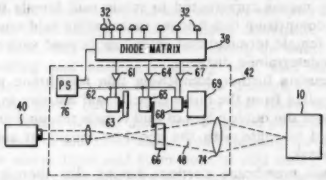
flector having a large area piezoelectric sound transducer disposed on one side thereof, said sound transducer having *n* electrodes spaced thereon to form *n* transducer units, means associated with each electrode for creating and applying a signal to each electrode with the signal being a frequency mixture of *m* frequencies to deflect the beam passing through each unit into *m* beam directions with the light frequency of each beam direction having a Doppler shift associated with the amount of deflecting, said means for directing the object beams including a lens raster consisting of *n* times *m* lens elements arranged in such a manner that each of the individual object beams produced by the means for modulating is widened to illuminate the entire storage medium, and said apparatus including means compensating for the Doppler shift in the light frequency of each of the object beams so that the capacity of interference of each of the object beams with the reference beams is maintained.

3,989,348

OPTICAL SCANNER WITH LARGE DEPTH OF FOCUS

Kenneth Clifford Hudson, Philadelphia, Pa., and Richard Francis Kenville, Delran, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Apr. 28, 1975, Ser. No. 572,006
Int. Cl.² G02B *27/17*
U.S. Cl. 350—6 **5 Claims**



1. An optical system for focusing an illuminating beam on an object surface which can be at any of a range of distances from a reference surface comprising in combination:

means producing an illuminating beam directed generally toward said object surface;

means providing a signal having a parameter indicative of the distance of said object surface from said reference surface;

optically transparent means comprising a plurality of optical plates having opposed parallel surfaces, each positionable in the path of said beam; and

means responsive to said signal for selectively positioning none, one or more than one plate in said path of said beam for focusing said beam on said object surface.

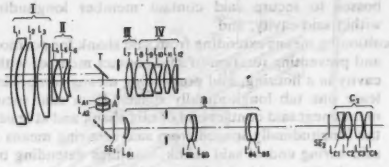
3,989,349

REFLEX FINDER

Walter Besenmatter; Trude Muszumanski, both of Vienna, and Gunter Kurz, Vosendorf, all of Austria, assignors to Karl Vockenhuber and Raimund Hauser, both of Vienna, Austria

Filed Feb. 4, 1974, Ser. No. 439,629
Claims priority, application Austria, Feb. 6, 1973, 1031/73
Int. Cl.² G02B *23/04*; G03B *13/06*
U.S. Cl. 350—33 **18 Claims**

1. A camera comprising a taking objective centered on an axis and provided with several axially spaced components forming a dispersive front lens group and a collective rear lens group, beam-splitting means between said lens groups for diverting incident light rays onto an off-axial ray path, and a view finder in said ray path including a finder objective, an eyepiece and inverting lens means therebetween, said finder objective comprising chromatism-correcting lens means including a biconvex lens of relatively low refractive index and relatively high Abbé number and a negative-meniscus lens of relatively high refractive index and relatively low Abbé number, each radius of curvature of any lens of said finder objective exceeding 0.3 times the focal length of the finder objective, said negative-meniscus lens turning a concave side toward said beam-splitting means.

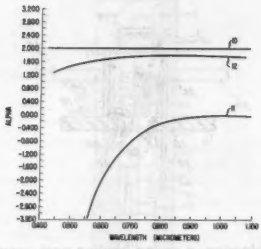


3,989,350

MULTIMODE OPTICAL FIBER

Leonard George Cohen, Holmdel; James William Fleming, Jr., Fanwood, and William George French, Plainfield, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 12, 1975, Ser. No. 612,646
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96 WG **5 Claims**



1. Glass transmission line for the transmission of electromagnetic radiation centering about a wavelength within the range of from 0.5 to 2.0 μm, said line comprising a core member manifesting a radially decreasing refractive index for said radiation from the axial core composition to the peripheral core composition, together with a cladding about said core, in which the said core consists essentially of SiO_2 and at least one refractive index modifying ingredient, in which the gradient within the said core is due at least in part to a radially increasing concentration of boron oxide, B_2O_3, to an ultimate peripheral core composition which is essentially borosilicate containing from 10 mole percent B_2O_3 to 20 mole percent B_2O_3, the said gradient approximating the form:

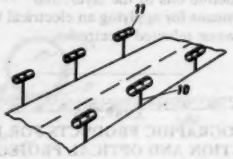
$$n = n_1[1-2\Delta(r/a)^{\alpha}]^{1/2},$$

in which the n_1 is the index maximum, r is the distance from the fiber axis, a is the core radius, Δ is the relative index difference between core center and cladding and α is a power law exponent which characterizes the profile, characterized in that Δ is equal to $n_1 - (n_2 - 0.007)/n_1$, n_1 and n_2 are index values as measured in bulk samples of glass of the compositions represented, respectively, by the axial core composition and the peripheral core composition.

3,989,351
REFLECTION DEVICE

John Bjorlund, Sodra vagen 68B, 412 54 Goteborg, Sweden (41254)

Filed Dec. 10, 1974, Ser. No. 531,333
Claims priority, application Sweden, Dec. 14, 1973, 7316892
Int. Cl.² G02B 5/12
U.S. Cl. 350—97 4 Claims

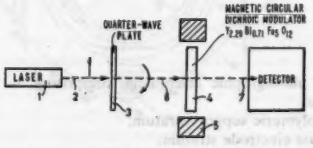


1. A reflective road marker comprising an elongated tubular means for removably supporting a reflecting element; means on said tubular means for mounting the tubular means at a desired level horizontally disposed over a road surface or similar surface so that said reflecting element is visable through opposite ends of said tubular means, the improvement wherein said tubular means includes an intermediate, transverse slot normal to the longitudinal axis thereof and opening into the outer surface of said tubular means; and a reflecting element having opposite reflecting surfaces, removably disposed in said slot, said tubular means having portions at opposite sides of said reflecting element of a length at least substantially equal to half the maximum internal cross-section of said tubular means at the location of the reflecting element, the portions of said tubular means at opposite sides of said reflecting element comprising through passages at which the reflecting surfaces of the reflecting element are exposed; said slot in the tubular means having a width substantially equal to the thickness of said reflecting element, said slot tapering from a medial portion of said tubular means toward the outer surface therefor for grippingly engaging opposite sides of said reflecting element.

3,989,352
BISMUTH SUBSTITUTED RARE EARTH GARNETS AS MAGNETO-OPTIC MATERIALS EXHIBITING MAGNETIC CIRCULAR DICHROISM

David Edward Lacklison; John Lincoln Page; Hugh Ivor Ralph, and George Blair Scott, all of Redhill, England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 24, 1974, Ser. No. 463,736
Claims priority, application United Kingdom, Apr. 26, 1973, 19899/73
Int. Cl.² G02F 1/09
U.S. Cl. 350—151 3 Claims

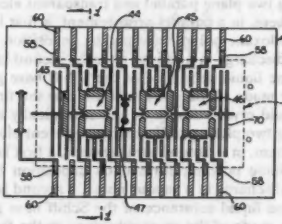


1. In a magneto-optic device having a transparent magneto-optic element capable of altering its transmission properties to light having a circularly polarized component at room temperature and where the material of the element exhibits the intrinsic property of magnetic circular dichroism, means to convey through the element a circularly polarized light beam, and means to detect intensity variations of the circularly polarized light beam caused by differences in the magnetization state of the element, the improvement wherein said element consists of a magnetic garnet material having the composition R_{3-x} Bi_x Fe_{5-y} A_y O_{12}, where R = Y, Nd, Sm, Eu, Gd; $0.2 < x < 2.0$ and for A = Ga, Al, $0 \leq y \leq 1.5$, and for A = In, Sc, $0 \leq y < 0.8$.

3,989,353
SOLID PLANAR LIQUID CRYSTAL DISPLAY WITH MATCHING LEADS

James M. Phalan, Sunnyvale, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Continuation of Ser. No. 412,003, Nov. 1, 1973, abandoned.
This application Mar. 20, 1975, Ser. No. 560,255
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC 8 Claims



1. A liquid crystal display comprising:
a first substrate having a plurality of indicia members communicating with an electrical source, said indicia members being selectively energized by said electrical source;
a second substrate substantially parallel to said first substrate and having at least a portion of one surface being conductive said portion of said one surface being configured on said second substrate such that said portion entirely circumscribes each perpendicular geometric projection of said indicia members onto said second substrate regardless of the precision of alignment of said indicia members with respect to said second substrate;
a spacing means for spacing said first substrate from said second substrate, said spacing means and said first and second substrates defining a cavity;
a liquid crystalline substance filling said cavity; and
a plurality of conductive leads disposed on said first substrate and selectively coupling said indicia members to an electrical source, said plurality of conductive leads having a perpendicular, geometric projection onto said conductive portion of said second substrate, shielding said liquid crystalline substance between said leads and said projection of said leads onto said conductive portion from view and having substantially similar optical properties as said portion of said one surface of said second substrate,
whereby said indicia members and plurality of leads may be energized by an electrical source without said leads being readily visible and without the need for the alignment of said indicia members and plurality of leads with respect to said second substrate to be precise.

3,989,354

NEMATIC LIQUID CRYSTAL OF HOMEOTROPICALLY ALIGNED TYPE AND A METHOD OF MANUFACTURING SAID DEVICE

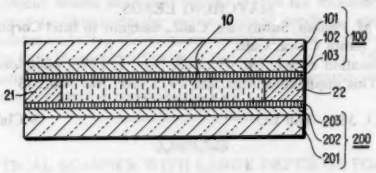
Jean Claude Dubois; Maryse Gazard, and Annie Zann, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Oct. 18, 1974, Ser. No. 516,020

Claims priority, application France, Oct. 19, 1973, 73.37360

Int. Cl.² G02F 1/16, 1/13

U.S. Cl. 350—160 LC 3 Claims



1. A liquid crystal device of homeotropically aligned type, comprising two plane parallel and transparent electrodes and, between them, in a parallel arrangement, a first layer of hexamethyldisiloxane polymer formed by deposition by means of electrical discharge in a vapour phase, a second layer made of a crystalline liquid substance of the Schiff base group, and a third layer made of the same substance as the first layer.

2. A liquid crystal device of homeotropically aligned type, comprising two plane parallel and transparent electrodes and, between them, in a parallel arrangement, a first layer of vinyltrimethylsilane polymer formed by deposition by means of electrical discharge in a vapour phase, a second layer made of a crystalline liquid substance of the Schiff base group, and a third layer made of the same substance as the first layer.

3. A liquid crystal device of homeotropically aligned type, comprising two plane parallel and transparent electrodes and, between them, in a parallel arrangement, a first layer of 1–7 dicyanoheptane polymer formed by deposition by means of electrical discharge in a vapour phase, a second layer made of a crystalline liquid substance of the Schiff base group, and a third layer made of the same substance as the first layer.

3,989,355

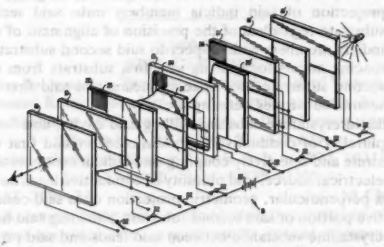
ELECTRO-OPTIC DISPLAY SYSTEM

Michael E. Wilmer, Portola Valley, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 21, 1975, Ser. No. 542,786

Int. Cl.² G02F 1/16

U.S. Cl. 350—160 LC 12 Claims



1. An electro-optic display comprising:

a. at least one layer of electro-optic material;

b. an addressing means for controlling the transmission of electromagnetic radiation through portions of said layer comprising a plurality of overlapping sets of address electrode plates electrically insulated from each other, one plate of each of said sets disposed on either side of said layer, at least one plate of each of said sets comprising individual electrodes, alternate individual electrodes in each such plate comprising substantially half of the total display area of said layer and being commonly coupled to a field creating means and the other alternate electrodes comprising substantially the other half of the total display area of said layer, said other alternate electrodes being commonly coupled to a field creating means, the electrodes in plates of one set overlying portions of electrodes in plates of other sets so that the overlying portions define bits of the layer; and

c. a switch means for applying an electrical field across said layer between selected electrodes.

3,989,356

PHOTOGRAPHIC PRODUCTS FOR DIRECT OBSERVATION AND OPTICAL PROJECTION, AND PHOTOGRAPHIC PROCESSES FOR THEIR PRODUCTION AND UTILIZATION, PHOTOGRAPHIC DEVICES FOR USE THEREWITH

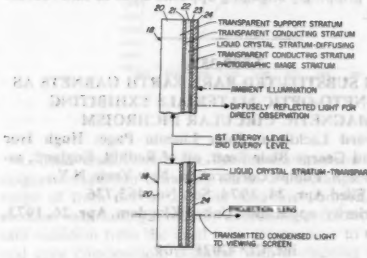
Gerald Altman, 41 Westminster Road, Newton, Mass. 02159

Continuation-in-part of Ser. No. 446,274, Feb. 27, 1974, abandoned, which is a continuation-in-part of Ser. No. 225,187, Feb. 10, 1972, Pat. No. 3,802,884, which is a continuation of Ser. No. 734,039, June 3, 1968, abandoned, which is a continuation-in-part of Ser. No. 655,714, July 6, 1967, abandoned. This application May 9, 1974, Ser. No. 468,441

The portion of the term of this patent subsequent to Apr. 9, 1991, has been disclaimed.

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC 48 Claims



22. A photographic assemblage comprising, in laminated sequence;

a. a polymeric support stratum;

b. a first electrode stratum;

c. a liquid crystal stratum containing a mixture of nematic material and cholesteric material, exhibiting a scattering optical texture under at least one voltage condition and a clear texture under at least another voltage condition;

d. a second electrode stratum;

e. a polymeric support stratum; and

f. a photographic stratum composed of a photosensitive material.

3,989,357
ELECTRO-STATIC DEVICE WITH ROLLING ELECTRODE

Charles G. Kalt, Hawthorne Road, Williamstown, Mass. 01267

Continuation-in-part of Ser. No. 495,189, Aug. 8, 1974, Pat. No. 3,897,997, and a continuation-in-part of Ser. No. 438,574, Feb. 1, 1974, abandoned, which is a continuation-in-part of Ser. No. 294,590, Oct. 3, 1972, abandoned. This application May 27, 1975, Ser. No. 580,572

Int. Cl.² G02F 1/16

U.S. Cl. 350—161 33 Claims

1. An electrostatic device with a rolling electrode comprising:
a. a fixed electrode of an electrically conductive material;
b. at least one resilient variable electrode comprising a sheet of electrically conducting material having the shape of a spiral roll and being physically attached near one end thereof to a surface of said fixed electrode; and
c. a layer of electrically insulative material being positioned between said fixed and said variable electrodes, said fixed and variable electrodes being of such relative geometries that when an electrical potential is applied between said fixed and variable electrodes, said variable electrode extends in the direction of unrolling and covers a large portion of said surface of said fixed electrode.

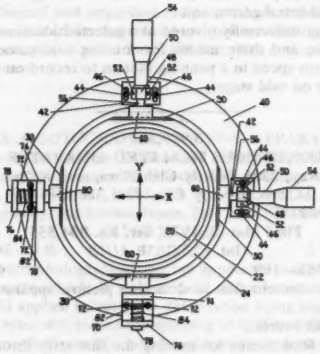
3,989,358
ADJUSTABLE MICROMETER STAGE

David L. Melmoth, Ann Arbor, Mich., assignor to KMS Fusion, Inc., Ann Arbor, Mich.

Filed Nov. 21, 1974, Ser. No. 525,748

Int. Cl.² G02B 7/02

U.S. Cl. 350—247 1 Claim



1. A mounting structure for an optical element and the like for achieving X–Y adjustment on a Z axis which comprises:
a. a support ring having four tangential slide surfaces spaced 90° from each other around the circumference to form orthogonal pairs,
b. four slide blocks engaging, respectively, a slide surface on side ring, over a tangential lineal span, in a tongue and groove sliding relationship on the tangent of said surface,
c. a support frame surrounding said support ring,
d. four brackets on said frame spaced 90° from each other around said frame to register with said surfaces on said ring,
e. a radially disposed shaft on each said bracket to support each said slide blocks, respectively,
f. means on two of said adjacent brackets resiliently biasing said shafts and two of said slide blocks radially inwardly against respective slide surfaces, and
g. manually operable means radially advanceable and retractable on said remaining brackets to control the radial position of said remaining two shafts and slide blocks.

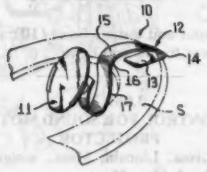
3,989,359
SELF-EXAMINING GENITAL MIRROR

Dolores C. Shutt, 7447 S. Shore Drive, Chicago, Ill. 60649

Filed Nov. 6, 1973, Ser. No. 413,251

Int. Cl.² G02B 5/08, 5/12

U.S. Cl. 350—288 4 Claims



1. A device particularly adapted for hygienic purposes comprising mirror means for visibly inspecting the vaginal and/or genital area of a person while in a seated position, bendable shape retaining means for conformingly attaching said mirror means to a toilet seat, said attaching means includes a generally C-shaped end portion for embracing attachment to a toilet seat, and said C-shaped end portion includes a generally flat uniplanar end for engagement beneath a toilet seat and an adjacent concavely curved portion adjusted to correspond generally to the curvature of the upper surface of a toilet seat.

3,989,360
OPTICAL DEVICE

Michel Duchet, Briis-sur-Forges, France, assignor to Compagnie Generale d'Electricite, Paris, France

Filed Sept. 29, 1975, Ser. No. 617,604

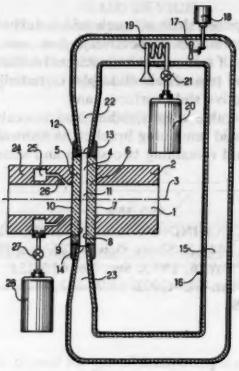
Claims priority, application France, Sept. 30, 1974, 74.32862

Int. Cl.² G02B 27/00

U.S. Cl. 350—319 6 Claims

1. Optical device comprising two optical elements each having two optical faces centred on a same axis, that device being intended to be crossed, along the said axis, by a light beam whose wavelength is about 10.6 microns, the faces of the said elements being coated with a non-reflecting layer for the said wavelength, one of the faces of each element being plane, the said elements being arranged so that these plane faces be adjacent to each other, the said plane faces having substantially identical dimensions, the other faces of the said elements forming, respectively, the input and output faces of the optical device, the said optical elements being made of a material selected from among germanium, a mixture of arsenic and of gallium, a mixture of cadmium and of telluride and a mixture of zinc and of selenium, characterized in that it comprises means (12 to 25) for making a cooling fluid which is transparent to the light of the said beam flow in the space (11) comprised between the said plane faces (8, 9), that flow

taking place in a direction substantially perpendicular to the said axis (3) and means (24 to 28) for directing onto at least



one of the said input and output faces (10) a flux of dry gas which is transparent to the said light.

3,989,361

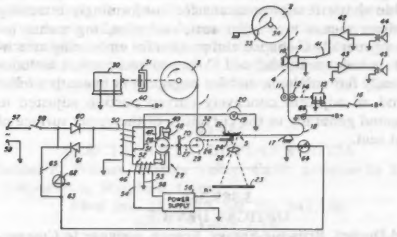
FILM SPEED CONTROL FOR SOUND MOTION PICTURE PROJECTOR

Thomas A. O. Gross, Lincoln, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 374,638, June 28, 1973, abandoned. This application Dec. 19, 1974, Ser. No. 534,196

Int. Cl.² G03B *31/00*

U.S. Cl. 352—14 **8 Claims**



1. A sound motion picture system, comprising means forming a projection station at a first location, a projection lamp located at said projection station, a film drive claw located at said projection station, means forming a sound station at a second location, a film drive capstan located at said sound station, means for guiding a strip of film over a path from said capstan to said claw, said path including a region in which the film is free to form a loop of variable length, an induction motor, means operated by said motor for driving said claw, capstan drive means for driving said capstan at constant speed, said motor comprising a set of windings linked by a common core, means connecting one of said windings in series with said lamp, first and second input terminals adapted to be excited by an alternating voltage, first and second output terminals connected to at least one of said windings, means connecting said first input terminal to said first output terminal, a rectifier connecting said second input terminal to said second output terminal to allow current of a first polarity to flow therebetween, an electronic switch connecting said second input terminal to said second output terminal when said switch is closed by an applied signal, a variable potential divider connected between said input terminals for producing an output voltage that is a controllable portion of the voltage applied to said input terminals, means responsive to the length of a loop of film in said region for controlling said potential divider, and voltage responsive means effective when an alternating voltage is applied to said input terminals and responsive to the voltage produced by said potential divider for applying a signal to close said switch for the balance of the duration of each half cycle of voltage on said input terminal that will cause current of a polarity opposite said first polarity to flow through said switch when the voltage produced by said potential divider reaches a predetermined value.

3,989,362

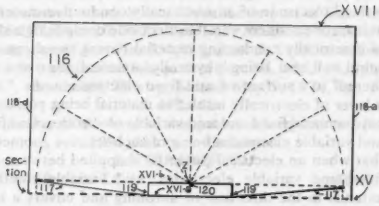
CIRCUMFERENTIAL STEREO SPECTACULAR, 360 DEGREES HORIZONTALLY AND VERTICALLY WITH MOSAIC IN SCENE

Henry Merritt Farnum, 225 E. 46th St., Apt. 9-L, New York, N.Y. 10017

Filed Nov. 1, 1972, Ser. No. 302,901

Int. Cl.² G03B *37/00*

U.S. Cl. 352—69 **13 Claims**



1. In a stage with a cyclorama, an improved apparatus to record and display a scene, comprising:

a stage with a first horizontal plane comprising locations at equal linear increments in the pattern of an equilateral triangle, and three similar planes comprising with said first plane the surfaces of a tetrahedron with a mosaic of those locations;

a cyclorama around at least a portion of said stage and generally spherical, with its center at a selected location in said tetrahedron; and

a camera universally pivoted at a selected location in said mosaic and drive means for rotating said camera at a uniform speed in a panning motion to record on film the scene on said stage.

3,989,363

CONTINUOUS FILM FEED APPARATUS

Hugh McKay, 2205 Beverly Glen Place, and William Arthur Meyer, 2425 N. Beverly Glen Blvd., both of Los Angeles, Calif. 90024

Filed Mar. 3, 1975, Ser. No. 554,555

Int. Cl.² G03B *41/10*

U.S. Cl. 352—109 **9 Claims**

1. A continuous film feed motion picture apparatus comprising:

a. a light source;

b. film feed means for moving the film strip through said apparatus at a predetermined, constant velocity;

c. an arcuate film gate including a pair of parallel spaced members adapted to engage the transverse edges of the film strip;

d. a first shaft being disposed through the center of a circle whose circumference includes said arcuate film gate;

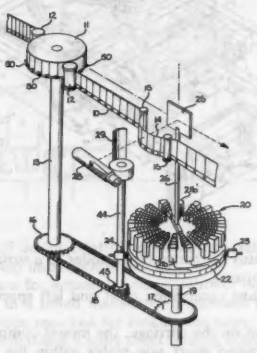
e. a reflecting member aligned with said film gate and said light source whereby light transmitted through the film strip is reflected from said reflecting member, said re-

flecting member being mounted upon said first shaft at the pivoting axis of said reflecting member;

f. rotating means for rotating at an angular velocity proportional to the angular velocity of the film strip over said arcuate film gate, said rotating means comprising:

i. a direct current power source;

ii. a plurality of ferromagnetic core pieces each having a pair of termini, said core pieces being in cylindrical alignment with each other and coupled to said film feed means, each core piece having its pair of termini in diametrically opposed positions, each core piece being uniformly spaced from the adjacent core piece and defining an interior, axial cavity;



iii. a plurality of pairs of commutator contacts in uniform spaced relation to given ones of said cylindrical aligned core pieces, each pair of said commutator contacts being in diametrically opposed relation to one another;

iv. a plurality of windings, one being disposed about each of said core pieces, each of said windings having first and second contacts, said first and second contacts of each of said windings being connected to respective pairs of commutator contacts;

v. brush means for sequentially coupling said direct current power source to said commutator contacts; and

g. osciallating means for oscillating said first shaft about the axis thereof and imparting reciprocating rotational motion to said reflecting member, said oscillating means being coupled intermediate said first shaft and said rotating means.

3,989,364

ELECTROPHOTOGRAPHIC COPYING APPARATUS

Touhei Kawakami; Kunio Tajima, and Seiichi Hayashi, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 18, 1975, Ser. No. 550,345

Claims priority, application Japan, Feb. 22, 1974, 49-20545

Int. Cl.² G03G *15/00*

U.S. Cl. 355—3 R **2 Claims**

1. An electrophotographic copying apparatus comprising a transfer master which is polarized in accordance with an electric field applied thereto, the polarization being kept after the field is removed; means for applying to said transfer master an electric field corresponding to the original picture to be copied; means for developing said transfer master; and means for transferring the developed image on said transfer master to a recording medium; said transfer master being a sintered body of lead monoxide, titanium dioxide, zirconium dioxide and lanthanum oxide, and further including a transparent electrode having a photoconductive layer, kept in contact with one of the principal surfaces of said transfer master; and means for exposing said photoconductive layer through said transparent electrode in accordance with the original picture and for applying the potential at said transparent electrode to said transfer master through said photoconductive layer.

3,989,365

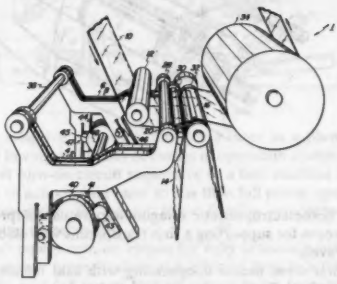
MOTION COMPENSATION FOR BEAD BYPASS

Roger G. Teumer, Fairport; Earl V. Jackson, Penfield, and LeRoy Baldwin, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed June 4, 1974, Ser. No. 476,188

Int. Cl.² G03G *15/00*

U.S. Cl. 355—3 P **8 Claims**



1. Apparatus for photoelectrophoretic imaging comprising

a. means for removing a bead of accumulated photoelectrophoretic imaging suspension of electrically photosensitive particles in a carrier liquid from the entrance of a nip region formed between two webs, each of said webs having inside and outside surfaces with respect to the nip, wherein successive portions of the inside surfaces of said webs move into contact with each other to form the nip comprising

i. means for advancing said successive portions of each web into contact with each other at the nip including means to advance each web relative to the nip region so that any bead portions carried on the inside surfaces are advanced beyond the nip region when the webs are separated from contacting engagement with each other; and

ii. means for separating the webs at the nip to a spacing sufficient to allow a bead of accumulated photoelectrophoretic imaging suspension to pass the nip region, wherein said separating means includes motion compensating means for automatically compensating for motion during separation whereby the advancing rate of velocity of the webs remains constant;

b. means for coating a photoelectrophoretic imaging suspension on successive portions of the inside surface of at least one of said webs before being brought into contact with the inside surface of the other web at the nip, said suspension being sandwiched between the inside surfaces of the webs at the nip;

c. means for applying an electrical field across said imaging suspension at least when said webs are in contact at the nip with the imaging suspension therebetween; and

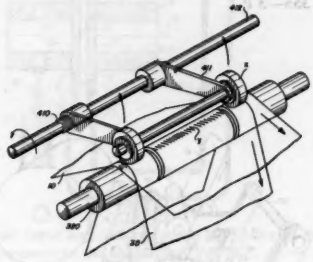
d. means for imagewise exposing said suspension at the nip to an image of activating electromagnetic radiation at least when said webs are in contact at the nip with the imaging suspension therebetween.

3,989,366

PHOTOELECTROPHORETIC IMAGING APPARATUS HAVING A DEVICE FOR INCREASING THE FRICTION FORCE BETWEEN WEBS

Roger G. Teumer, Fairport; Peter J. Warter, Jr., Penfield; Gino F. Squassoni, Pittsford; Vsevolod Tulagin, Rochester, and Raymond K. Egnaczak, East Williamson, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 24, 1975, Ser. No. 571,197
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 P 16 Claims



1. Photoelectrophoretic imaging apparatus comprising:

a. means for supporting a first transparent web electrode for travel;

b. first drive means cooperating with said means for supporting a first transparent web electrode to advance a first transparent web electrode through a predetermined path passing an ink coating means and an imaging station;

c. ink coating means for applying a thin film of photoelectrophoretic ink to the first transparent web electrode;

d. means for supporting a second web electrode for travel;

e. second drive means cooperating with said means for supporting a second web electrode to advance the second web electrode through a predetermined path passing the imaging station;

f. an imaging roller mounted at the imaging station; the second web electrode advanced into contact therewith; and whereat the ink carrying surface of the advancing first transparent web electrode is advanced by (a) and (b) into contact with the advancing second web electrode while it is contacting said imaging roller, thereby forming an ink-web sandwich and an imaging zone nip at said imaging roller, the two webs having ink sandwiched between them, supported at the imaging zone nip by said imaging roller on the second web electrode side of the sandwich without a support member contacting the imaging zone area on the first transparent web electrode side of the sandwich at the imaging zone nip;

g. means for coupling a voltage source to the imaging roller to establish an electric field across the ink-web sandwich at the imaging zone nip;

h. exposure means for projecting an image pattern of activating electromagnetic radiation through the first transparent web electrode onto the ink-web sandwich at said imaging roller;

i. means for separating the two webs from contact after the two webs have been advanced past the imaging station and said imaging roller to form an image pattern corresponding to the activating electromagnetic radiation on at least one of the webs; and

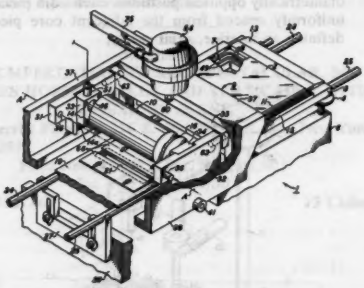
j. means for increasing the friction force between the two webs at the imaging zone side of the sandwich provided on the first transparent web electrode to press against the webs and imaging roller on at least one side of the imaging zone thereby increasing the friction force between the two webs and preventing slip at the imaging zone.

3,989,367

APPARATUS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACTED

Earl V. Jackson, Penfield; Wayne F. Schoppe, Webster; Gino F. Squassoni, Pittsford, and Peter J. Warter, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 373,560, June 25, 1973, Pat. No. 3,860,336. This application Sept. 25, 1974, Ser. No. 509,189
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 P 4 Claims



1. Apparatus for contacting a roller to a surface to be contacted comprising:

a. a carriage comprising right and left spaced apart sideboards;

b. a mount on the carriage, the mount comprising left and right spaced apart side plates within the carriage sideboards, the mount side plates being pivotally connected to the sideboards, wherein the mount pivots about an axis parallel to a surface to be contacted and perpendicular to the direction of advancement of the carriage and the mount;

c. at least one roller rotatably mounted to the mount to permit the roller to pivot in a plane perpendicular to the direction of advancement of the roller, and about an axis parallel to the surface to be contacted;

d. pivot stop means carried by the carriage sideboards to stop the downward pivot of the mount and the roller at a predetermined position when the roller is not over the surface to be contacted;

e. drive means for advancing the carriage, the mount and the roller into contact with the surface to be contacted;

f. force means carried by the carriage for applying a downward force over and above gravitational force to the mount and thereby to the roller when the surface of the roller is in contact with the surface to be contacted; and

g. beveled ramps adjacent to, and in the direction of advancement of the roller, prior to the surface to be contacted to permit the roller to contact the beveled ramps to gradually raise the roller to the elevation of the top of the surface to be contacted to permit the roller to pass across the surface to be contacted, the beveled ramps at the same time gradually raising the mount off the pivot stop means.

3,989,368

REPRODUCING MACHINE CYCLE OUT CONTROL SYSTEM

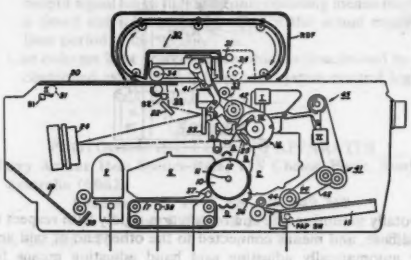
Lawrence R. Sohm, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 506,136, Sept. 16, 1974, which is a division of Ser. No. 393,546, Aug. 31, 1973. This application Nov. 29, 1974, Ser. No. 528,162
Int. Cl.² G03G *15/30*
U.S. Cl. 355—8, 3 Claims

2. A reproducing machine for making a copy of an original document on a copy sheet comprising;

a photosensitive surface;

a plurality of process step implementing means for making a copy including: means for charging said surface; means for exposing said surface to an image of said document original, said exposure means including means for moving said document, and means for viewing said moving document for projecting an image thereof onto said photosensitve surface to form a latent electrostatic image thereon; means for developing said latent electrostatic image; and means for feeding said copy sheet;



a plurality of device control elements associated with said process step implementing means;

control means for actuating said plurality of device control elements in a timed manner to implement the machine process steps required for making the copy;

means for generating a copy sheet trailing edge signal upon the detection of the copy sheet trailing edge; and

means responsive to said trailing edge signal for enabling said machine to cycle-out and stop its copying operation, said cycle-out means including means for disabling said development means.

3,989,369

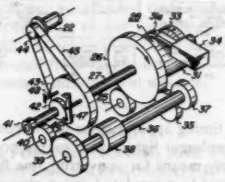
SCANNING MECHANISM FOR A COPYING APPARATUS

Yoshiharu Namba, Webster, N.Y., assignor to Rank Xerox, Ltd., London, England

Filed Jan. 10, 1975, Ser. No. 540,187

Int. Cl.² G03G *15/30, 15/04*

U.S. Cl. 355—8 **10 Claims**



1. Scanning apparatus for scanning first documents with up to a first length with a first scanning cycle time and for scanning second documents with up to a second length shorter than the first length with a second scanning cycle time less than said first scanning cycle time, said apparatus comprising:

means for scanning said first document along a desired path at a first speed over a first distance corresponding to said first length to form an exposure of said first document; and

means for scanning said second document along said path at said first speed over a second distance shorter than said first distance and corresponding to said second length to form an exposure of said second document and for scanning a remaining distance along said path up to said first distance at a second speed;

whereby for shorter documents an increased number of scan cycles per unit time may be obtained.

3,989,370

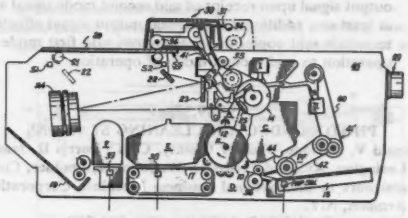
ADAPTIVE FUSER CONTROLLER

Thomas J. Mooney, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 1, 1975, Ser. No. 564,173

Int. Cl.² G03G *15/00*

U.S. Cl. 355—14 **25 Claims**



2. An adaptive control circuit for a fuser in a photocopy machine having a plurality of modes of operation comprising:

a. a soft turn-on circuit responsive to a first machine condition to actuate said fuser to less than full power operating requirements for proper toner fixation on copy sheets passing thereby; and

b. a full power turn-on circuit for fully actuating said fuser for proper toner fixation at a selected time in a machine cycle, said full power turn-on circuit being responsive to the particular mode of operation of said photocopy machine and the selected time for a full power turn-on corresponding to a particular mode of operation;

c. whereby current surges of said fuser are maintained sufficiently low upon application of said full power turn-on to substantially eliminate copy quality degredation.

3,989,371

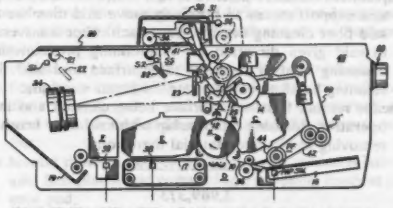
CYCLE-OUT LOGIC FOR A MULTI-MODE COPIER/DUPLICATOR

William L. Valentine, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 1, 1975, Ser. No. 564,171

Int. Cl.³ G03G *15/00*

U.S. Cl. 355—14 **15 Claims**



1. A cycle-out logic system for a copier/duplicator having a moving optical system for operation in a first mode of operation and a fixed optical system for operation in a second mode of operation, and means including switching means for changing between the first and second modes comprising:

means for enabling said copier/duplicator to remain in either one of said first and second modes of operation upon the actuation of said means for changing between said first and second modes until a pre-determined machine event in said one mode of operation;

said switching means providing a first mode signal and a second mode signal corresponding respectively to said first and second modes of operation and said means for enabling said copier/duplicator to remain in said first mode upon actuation of said switching means comprises:

a first logic circuit;

means for connecting said first logic circuit to receive said first and second mode signals from said switching means;

means for connecting said first logic circuit to receive at least one additional signal corresponding to said predetermined machine event in said first mode of operation; and

means for connecting said first logic circuit to provide an output signal upon receipt of said second mode signal and at least one additional signal, said output signal effective to switch said copier/duplicator from said first mode of operation to said second mode of operation.

3,989,372

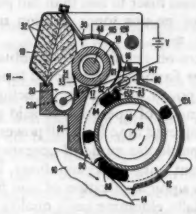
PHOTOCONDUCTOR CLEANING STATIONS

Ronald V. Davidge, Boulder County, Colo.; Dorris D. James, Lexington, Ky., and Frederick W. Johnson, Boulder, Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 7, 1975, Ser. No. 593,917

Int. Cl.² G03G *21/00*

U.S. Cl. 355—15 **48 Claims**



1. In a reproducing machine, a surface cleaner for a photoconductor member having a surface to be cleaned, including in combination:

a fiber cleaning brush adapted to remove particulate material from the surface;

means supporting said fiber brush and said member for relative movement along a given direction for cleaning said surface;

status means indicating a predetermined machine status;

adjustment means responsive to said indication and being in said support means to relatively move said member and said fiber cleaning brush toward each other transversely to said given direction for maintaining predetermined cleansing contact between said surface and said fiber cleaning brush to compensate for brush wear; and

means remote from said surface being cleaned and in an operative cleansing relationship with said fiber brush for removing particulate material therefrom.

3,989,373

AUTOMATIC FOCUSSING ATTACHMENT FOR PHOTOGRAPHIC ENLARGERS

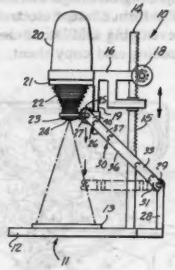
Dwin R. Craig, 9447 Emory Grove Road, Gaithersburg, Md. 20760

Filed June 12, 1974, Ser. No. 478,769

Int. Cl.² G03B *27/36*

U.S. Cl. 355—56 **4 Claims**

1. A combined automatic focussing attachment and photographic enlarger including a base, an upright column rigidly secured to the base and extending upwardly therefrom, an enlarger head mounted for hand adjustable vertical sliding linear movement on said column, a bellows depending from said enlarger head, means depending from said enlarger head cooperating with means connected to the lower end of said bellows for hand adjusting the length of said bellows, a lens supported on the lower end of said bellows, said attachment comprising a link arm of adjustable effective length, means



pivotally mounting one end of said arm rigidly with respect to said base, and means connected to the other end of said arm for automatically adjusting said hand adjusting means for varying the length of said bellows as said enlarger head is raised and lowered on said column with said link arm changing in effective length as said enlarger head is raised and lowered.

3,989,374

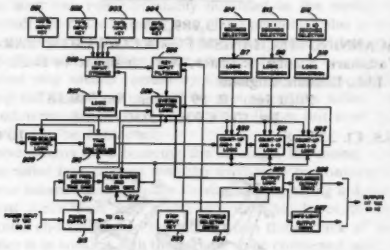
ELECTRONIC TIMING DEVICE

Henry C. Latka, 158 Berkley St., Rochester, N.Y. 14607, and David J. Leveille, 166 North St., Rochester, N.Y. 14604

Filed June 23, 1975, Ser. No. 589,424

Int. Cl.² G03B *27/70*

U.S. Cl. 355—69 **15 Claims**



1. Electronic timing apparatus for use in combination with a photographic enlarger light power source comprising:

a. power supply means for converting line frequency alternating current to a regulated direct current;

b. means for generating and shaping periodic pulses from a line frequency current, said periodic pulses forming an electronic time base signal for the operation of said apparatus;

c. preset exposure time means for presetting the time period the enlarger light source is to provide exposure for a photographic print;

d. actual exposure time selection means for selecting the actual exposure time period and for generating a signal representative of the actual time period for which the enlarger light source is to provide exposure for a photographic print, said actual exposure time period being of equal or lesser duration than said preset time period and an arithmetic function thereof;

e. time base prescaler means for reducing the number of periodic pulses per second in said electronic time base

signal, said periodic pulses being proportionately reduced responsive to the signal generated by the actual exposure time selection means;

f. time base prescaler control logic means for reprogramming the time base prescaler means with the signal generated by the actual exposure time selection means;

g. electronic counting means for counting the number of periodic pulses contained in the electronic time base signal after said signal has been modified by the time base prescaler means;

h. system logic control means for providing a controlled output signal when the electronic counting means reaches a timed out state representative of the actual exposure time period; and

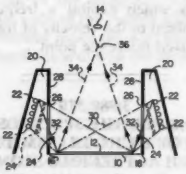
i. an enlarger light power source which is deactivated by the controlled output signal from said system control logic.

3,989,375

PHOTOGRAPHIC COPYING APPARATUS

Harry Arthur Hele Spence-Bate, 115 Cheam Place, Morley, Australia (6062)

Filed Feb. 12, 1975, Ser. No. 549,369
Int. Cl.² G03B *27/54*
U.S. Cl. 355—70 **9 Claims**



1. A photocopying apparatus comprising:

a surface for receiving a document to be copied;

a camera with a lens directed towards said surface;

an illumination housing adjacent a first edge of said surface, said illumination housing including a deflector;

a window in a wall of said housing at said first edge of said surface;

a source of light in said housing; and

diffusion means in said housing distinct from said light source for diffusing substantially all the light from said light source that is reflected from said surface into said lens, said diffusion means including a plate extending from an edge of said window into said housing whereby light is directed from said source to said reflector to said diffusion means through said window.

3,989,376

DEVICE FOR POSITIONING AND COVERING DOCUMENTS IN A REPROGRAPHIC MACHINE

Giovanni Ravera, and Giorgio Siletto, both of Turin, Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed May 28, 1974, Ser. No. 474,293
Claims priority, application Italy, June 12, 1973, 25090/73
Int. Cl. G03b *27/62*
U.S. Cl. 355—75 **8 Claims**

1. In a book-copying machine having a frame and an illumination plane on which an original having a thickness up to a predetermined value is positioned during use for the copying thereof, a device for releasably fixing the original to be copies in position and covering the portion thereof on the illumination plane comprising:

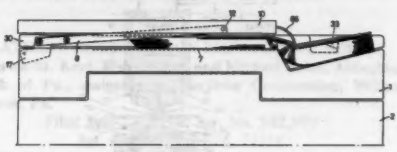
a pair of support arms pivotally mounted at one end portion on a first pivot axis on said frame and extending on opposite sides of said illumination plane;

a cover for covering the original to be copied and pivotally mounted on the opposite sides thereof between the other end portions of the support arms for rotation about a second pivot axis parallel to the first pivot axis;

an actuating arm pivotally mounted at one end portion on one of said sides of the illumination plane to said frame and extending adjacent to one supported side of said cover for angular displacement between a first position substantially lying in the illumination plane and second position;

first means operatively connecting said actuating arm to said support arms for rotatiing said support arms around said first pivot axis to lift said cover with respect to said illumination plane upon rotation of said actuating arm towards it second position;

second means operatively connecting said actuating arm to said cover for causing said cover to rotate about said



second pivot axis and to align a supported side of it with said actuating arm upon rotation of said actuating arm towards its second position; and

third means operatively connecting said actuating arm to said support arms for rotating said support arms around said first pivot axis to lower said cover until it contacts the surface of the original to be copied that is opposite the face to be copied upon rotation of the actuating arm from the second position to a position intermediate between said second and first positions and depending upon the thickness of the original positioned on the illumination plane and for pressing said cover against said opposite surface upon rotation of said actuating arm from said intermediate position to said first position thereby rotating said cover around said second pivot axis to make the cover parallel with said opposite surface.

3,989,377

EXPOSURE AND HEAT DEVELOPMENT DEVICE

David S. Smith, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,461
Int. Cl.² G03B *27/04*
U.S. Cl. 355—85 **11 Claims**

1. Apparatus for imagewise exposing and developing an area of a first film having a heat-light-sensitive layer and an area of a second film having a vesicular layer, said apparatus comprising:

a station for receiving the image to be reproduced;

a first platen arranged in an aligned and spaced relation to the receiving station and comprising a transparent, pressure member and means for heating the pressure member;

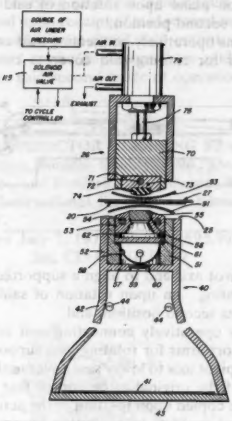
a second platen arranged in aligned and spaced relation to said first platen and comprising a generally resilient pressure pad;

means operatively coupled to at least one of said platens for providing relative movement between a first position in which said platens are spaced for permitting the first and second films to be positioned therebetween with the heat-light-sensitive layer in contact with the vesicular layer and a second position in which the pressure member and pressure pad maintain the first and second films in intimate contact under pressure;

first means, including a source of radiation of one spectral frequency for illuminating the image to be reproduced, for exposing that image through the first film onto an area of the heat-light-sensitive layer;

means for controlling the heating means for a period of time equivalent to at least the exposure time to impart heat to the pressure member for trasfer to the first and second films and the pressure pad, such heat developing the image-exposed area on the heat-light-sensitive layer and conditioning the second film;

second means including a source of radiation of a second and different spectral frequency for exposing the vesicular layer to the heat-developed image area on the heat-



light-sensitive layer, while the layers are still in contact, the heat imparted to the second film by the first film causing development of the image on the vesicular layer generally simultaneously with the exposure thereof; and

means for controlling the sequential operation of the moving means and the respective sources of radiation to provide a cycle of operation in which said platens are in said second position during exposure by the radiation of the one spectral frequency.

3,989,378

METHOD FOR NO-CONTACT MEASUREMENT

Knut Heitmann, Auf dem Gorg 4; Eckart Schneider, Lauerstrasse 3, both of 633 Wetzlar, and Hermann Eisenkopf, Eichendorffstrasse 10, 6335 Nauheim, all of Germany

Continuation of Ser. No. 283,967, Aug. 28, 1972, abandoned. This application June 19, 1974, Ser. No. 480,822

Claims priority, application Germany, Sept. 9, 1971, 2144487; Dec. 8, 1971, 2160877

Int. Cl.² G01P *3/36*

U.S. Cl. 356—28 **2 Claims**

1. In a method for the no-contact measurement of the relative velocity, position or displacement path of an object with respect to a reference position in at least one coordinate direction, or of the degree of image definition of an image, the improvement comprising the steps of:

a. illuminating an object of stochastic structures randomly distributed and without special ruled markings;

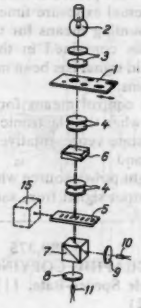
b. utilizing light fluxes emanating from said object for forming an image of said object in an image plane;

c. producing discernible images of said object;

d. mounting in said image plane an optical structure of repetitive pattern displaying a specific spatial frequency component to receive said object images and to filter from said image structures a structure component corresponding with said spatial frequency component;

e. generating from said filtered light fluxes at least one pair of optical push-pull signals;

f. separating said optical push-pull signals in at least two directions; and



g. generating from said optical push-pull signals electrical output signals which exhibit a frequency component being proportional to the velocity of travel of said object relative to a fixed reference point.

3,989,379

APPARATUS FOR THE SPECTROSCOPICAL EXAMINATION OF LIGHT TRANSMITTING OBJECTS SUCH AS PRECIOUS STONES

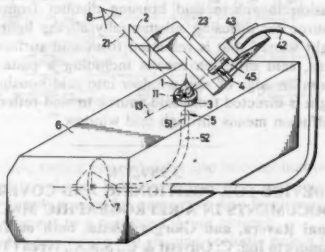
Manfred Eickhorst, Hans-Henny-Jahnn-Weg 21, 2 Hamburg 76, Germany

Filed May 27, 1975, Ser. No. 581,278

Claims priority, application Germany, May 27, 1974, 7418353[U]

Int. Cl.² G01N *21/00*

U.S. Cl. 356—30 **10 Claims**

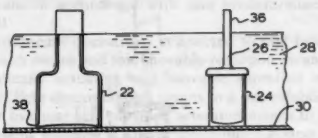


1. An apparatus for the spectroscopical examination of light transmitting objects such as precious stones comprising a spectroscope unit, receptacle means for the object to be examined, and a light source, the object of examination in the receptacle being situated at the point of intersection of the optical axes of the spectroscope and of the light source, wherein the receptacle means are provided with a light transmitting support and the light source comprising a first source shining light onto the stone from above and a second source shining light through the stone, the angles between the optical axes of the spectroscope and the light sources being adjustable.

3,989,380
APPARATUS FOR DETECTING FLAWS IN TRANSPARENT CONTAINERS

Tibor Spitz, Montreal, Canada, assignor to Dominion Glass Company Limited, Montreal, Canada

Filed Apr. 14, 1975, Ser. No. 567,980
Claims priority, application Canada, Apr. 2, 1975, 223704
Int. Cl.² G01B 11/16; G01N 21/16
U.S. Cl. 356—32 2 Claims

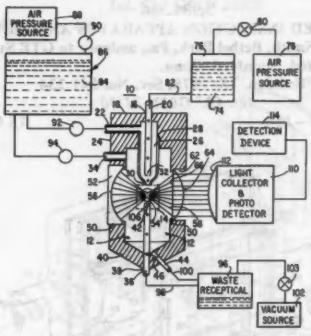


1. A method of testing a container of a light transmitting material, the method comprising the steps: filling the container with an opaque material; immersing the container in a bath having two parallel walls of light transmitting material and containing a light transmitting liquid, the liquid having a refractive index comparable with that of the material of the container and a light transmitting efficiency different from that of the material of the container, and projecting light through the parallel walls of the bath to illuminate the walls of the container to thereby make the wall thickness clearly visible whereby the distribution of wall thickness can be studied.

3,989,381
OPTICAL CHAMBER WITH SPHERICAL REFLECTIVE PORTION AND APPARATUS EMPLOYING SAME

Mack J. Fulwyler, Los Alamos, N. Mex., assignor to Coulter Electronics, Inc., Hialeah, Fla.

Filed May 5, 1975, Ser. No. 574,270
Int. Cl.² G01N 33/16, 21/00
U.S. Cl. 356—39 4 Claims



1. An apparatus for measuring characteristics of small particles such as blood cells while the particles are suspended in a liquid including in combination:

a source of light for developing a light beam;

a housing forming an optical chamber and including means for allowing transmission of said light beam from said source into said chamber, said housing including a substantially spherical shaped portion with the center of said spherical shaped portion substantially at the point of convergence of said light beam in said chamber, said spherical shaped portion having a light reflective surface formed thereon for reflecting light therefrom,

means for moving the particle suspending liquid through said chamber in a thin stream to cause particles therein to pass in sequence through said light beam one by one at a junction and to produce resultant light by passage through said beam;

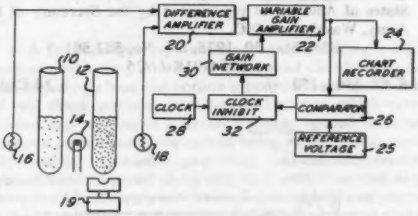
at least one photoresponsive pick-up element aligned with said junction and positioned substantially opposite said spherical shaped portion for detecting the resulting light produced by said particles and the resultant light reflected by the light reflective surface of said spherical shaped portion whereby said particles are detected and identified,

said center of said spherical shaped portion and the radius of curvature of said spherical shaped portion are selected such that the resultant light produced by particles passing through said junction which strikes said reflected surface strikes same perpendicular to said reflective surface and is reflected back substantially to the junction.

3,989,382
PLATELET AGGREGATION MONITORING DEVICE

Frederick M. Kent, Warrington, and Michael Sokol, Abington, both of Pa., assignors to Bio-Data Corporation, Willow Grove, Pa.

Filed Jan. 22, 1975, Ser. No. 542,997
Int. Cl.² G01N 33/16, 21/14
U.S. Cl. 356—39 13 Claims



1. A platelet aggregation monitoring device comprising:

means for continuously generating a signal representing the difference in the optical densities of a platelet rich plasma sample and a platelet poor plasma sample;

means for multiplying said signal by a variable factor;

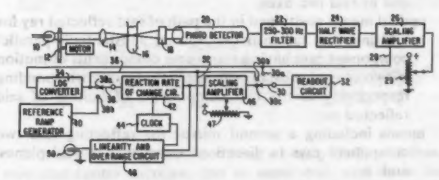
means for automatically adjusting said factor such that said multiplied signal is initially equal to a preselected standard value, whereby the sensitivity of the device is automatically adjusted;

and means for maintaining said factor constant once it has been adjusted to the point that said multiplied signal is equal to said preselected standard value.

3,989,383
REACTION DETECTION SYSTEM

Gerald Lee Paulson, Hollywood, Fla., assignor to Bio-Technology Instruments Corporation, Hialeah, Fla.

Filed Apr. 7, 1975, Ser. No. 565,665
Int. Cl.² G01J 3/42; G01N 21/00
U.S. Cl. 356—96 24 Claims



1. In a reaction detection system for determining the reaction rate of a sample wherein said reaction is represented by an electrical input signal which can vary in accordance with

said reaction during a predetermined time increment, the combination including;

input means for receiving said electrical input signal,

first sampling means coupled to said input means and operative at predetermined first intervals to sample said electrical input signal and develop a first sampling signal during said sampling proportional to said electrical input signal and to hold said first sampling signal until the following sampling,

second sampling means coupled to said first sampling means and operative at predetermined second intervals to sample said first sampling signal and develop a second sampling signal during said sampling proportional to said first sampling signal and to hold said sampling signal until the following sampling,

summing circuit means coupled to said first and second sampling means and operative to develop an output signal representing the difference between said first and second sampling signals, and

display means coupled to said summing means and operative in response to said output signal to display an output proportional to said output signal.

3,989,384

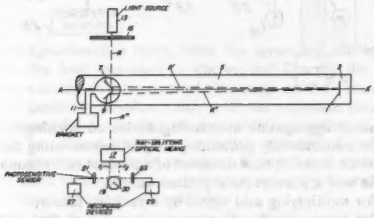
SYSTEM FOR MEASURING SMALL ANGULAR MOTIONS

Eugene M. Friedman, Landing, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 30, 1975, Ser. No. 582,501

Int. Cl.² G01B 11/26

U.S. Cl. 356—152 **10 Claims**



1. A system for measuring the components of angular motion of an object about two perpendicular axes, comprising:

a first mirror fixed to said object and containing said two axes;

means for projecting a collimated primary light ray onto said mirror, at the intersection of said axes, along a first path at a small angle with a perpendicular to said mirror at said intersection, said light ray being reflected from said mirror along a second path at an equal angle with said perpendicular, whereby angular motion of said mirror about said axes, due to angular motion of said object, causes the reflected ray to move transversely with components of motion in two planes perpendicular to each other and to said two axes;

optical means positioned in the path of said reflected ray for splitting that ray into two spaced substantially-parallel component rays having transverse components of motion in two spaced substantially-parallel planes corresponding respectively to the two components of motion of said reflected ray;

means including a second mirror for reflecting said two component rays in directions transverse to said planes; and

a photosensitive sensor positioned in the path of each of said reflected component rays, each sensor comprising means responsive to the respective reflected component ray for measuring the transverse motion thereof.

3,989,385

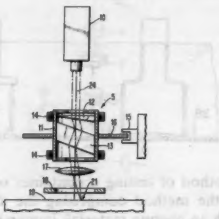
PART LOCATING, MASK ALIGNMENT AND MASK ALIGNMENT VERIFICATION SYSTEM

Frederick H. Dill, South Salem, and Jan P. Hoekstra, Putnam Valley, both of N.Y., assignors to International Business Machines Corporation, Yorktown Heights, N.Y.

Filed Sept. 16, 1974, Ser. No. 506,647

Int. Cl.² G01B 11/26

U.S. C.. 356—152 **18 Claims**



1. Appartus for determining part positioning by detecting scattered light from a target with a specular surface, and having light scattering edges located on said part comprising:

a source of colliminated light,

first means for rotating light produced by said source to produce a rotating beam of light,

second means, having an axis, for focusing said rotating light beam to a spot in a plane occupied by said target,

third means for sensing light scattered from said target edges, said third means located off said axis, and producing an electrical signal in response to said scattered light only,

fourth means, associated with said first means for providing a second electrical signal indicative of spot location, whereby location and orientation of said part can be determined from said first and second signals.

3,989,386

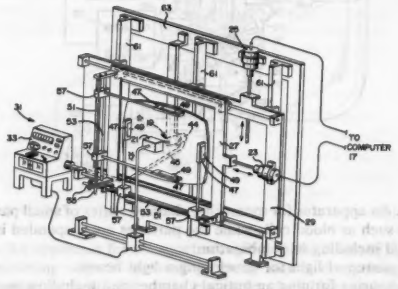
AUTOMATED INSPECTION APPARATUS AND METHOD

Charles W. Smith, Bethel Park, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Jan. 15, 1975, Ser. No. 541,234

Int. Cl.² G01N 21/30

U.S. Cl. 356—156 **15 Claims**



1. An automated inspection apparatus for sequentially inspecting a plurality of selected areas of an apertured metallic material in accordance with a predetermined pattern to determine the relative sizes of the apertures within said material, said apparatus comprising:

light determination means including an established light source for projecting a collimated column of light to one side of said metallic material and a singular light detec-

tion means positioned on an opposing side of said metallic material substantially opposite said established light source for detecting the light from said light source passing through at least one of said apertures within each of said selected areas of said material;

movable retention mean for fixedly retaining said metallic material between said light source and said light detection means and for moving said metallic material to sequentially position each of said selected areas of said metallic material between said light source and light detection means in accordance with said predetermined pattern; and

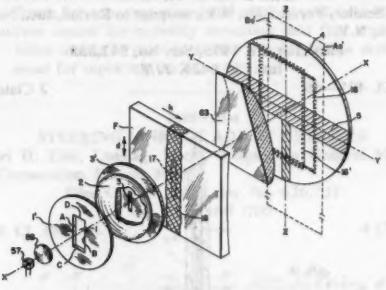
control means operatively connected to said light determination means and said movable retention means for automatically actuating said movable retention means and said light determination means in a pre-established manner to cause said movable retention means to move said metallic material in said predetermined pattern, said light source to project said collimated light to one side of each of said selected areas, and said singular light detection means to detect the light passing through said material at each of said selected areas when said selected areas are positioned between said light source and said singular light detection means in accordance with said predetermined pattern, said predetermined pattern comprising a planar pattern wherein said selected areas are spacedly positioned along a plurality of linear projections intersecting at a point substantially centrally located on said apertured material, the first of said areas to be inspected located at said centrally located point.

3,989,387

METHOD AND APPARATUS FOR DETECTING OPTICAL DEFECTS IN TRANSPARENT SHEETS

Stephane Hategan, Charenton, France, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France

Continuation-in-part of Ser. No. 290,528, Sept. 20, 1972, abandoned. This application Dec. 11, 1974, Ser. No. 531,610
Claims priority, application France, Sept. 24, 1971, 71.34556
Int. Cl.² G01N *21/00*
U.S. Cl. 356—239 **13 Claims**



1. Apparatus for testing a body for optical defects, said apparatus comprising:

a. an extended luminous source,

b. focusing means for forming, from light from said source, an image of said source at an image location,

c. means to support said body in the path of the beam at a position between said focusing means and said image location,

d. a photoelectric cell disposed substantially at said image location, said cell having an extended light-sensitive element and being responsive to the positional shift of said image on said element, and

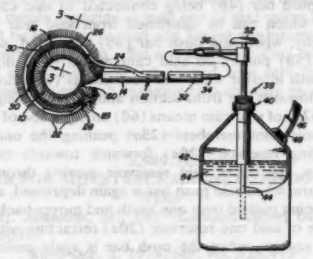
e. circuit means connected with said cell for producing an output signal upon displacement of said image on said element.

3,989,388

FOUNTAIN-TYPE PIPE CLEANING BRUSH

Anders V. Sparr, Sr., Rte. 1, Box 272, Milligan Road, Waupun, Wis. 53963

Filed Sept. 17, 1975, Ser. No. 614,741
Int. Cl.² A46B *11/00*
U.S. Cl. 401—11 **4 Claims**



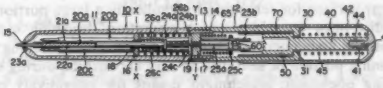
1. A fountain-type pipe cleaning brush including a shank portion terminating at one end in a partial circular loop section including a base end portion supported from said one end of said shank portion and a free end portion which curves toward and terminates a distance closely spaced from said base end portion, said loop section being equipped with generally radially outwardly projecting and circumferentially spaced bristles spaced along said loop section as well as an elongated liquid supply tube extending along said loop section in the plane thereof and closely paralleling and spaced slightly outwardly of the outer periphery of said loop section, said supply tube including an inlet end portion supported from the other end of said shank and a closed end portion supported from said free end portion, said inlet end portion being adapted for communication with a source of liquid under pressure, said liquid supply tube including a plurality of liquid outlets spaced therealong and opening inwardly toward said loop section and the base ends of said bristles supported from said loop section, said loop section being constructed of shape retentive but bendable and resilient material, whereby said loop section may be at least slightly expanded for engagement over a cylindrical member to be cleaned by said bristles.

3,989,389

MULTI-COLOR MECHANICAL WRITING INSTRUMENT

Yasuyuki Hashimoto, Nishinomiya, and Osamu Torii, Kyoto, both of Japan, assignors to Ancos Co., Ltd., Osaka, Japan

Filed Aug. 4, 1975, Ser. No. 601,670
Claims priority, application Japan, Aug. 22, 1974, 49-96905
Int. Cl.² B43K *5/16*
U.S. Cl. 401—30 **3 Claims**



1. A multi-colored ink pen having a casing (1, 2) with front, rear and center sections, and an outer end, said outer end having an aperture to allow passage of an ink reservoir tip therethrough, a push bar at said rear end and at least first and second elongated ink reservoirs (20*a*, 20*b*) in said casing operated by said push bar (40) with rear ends towards the

center section and, tips disposed in the vicinity of said outer end; thin elongated joint members (25*a*, 25*b*) with a joint front and rear ends, each of said joint front ends being attached to one of said ink reservoirs rear ends, the improvement therein comprising:

a. rotary cam means (60) in said rear section including a blocking means (62, 62*a*) disposed for contacting said joint rear ends to individually depress one of said joint rear ends to urge out the ink tube to which said one joint is attached, and outer cam ribs (63) with cam faces;

b. a saw tooth interior wall (7) in said casing rear section, a cam body (50) having sawtooth edges (52) disposed to engage said cam faces; and,

c. said push bar (40) being connected to said cam body (50), which can be depressed from said rear section, whereby, when said push bar (40) depressed, said cam body (50) pushes on said cam means (60) along said sawtooth interior wall, said cam means (60) moves forward towards the front section and said blocking means (62, 62*a*) of said cam means (60) engages one of said ink reservoir joint members (25*a*) pushing the one corresponding reservoir (20*a*) forwards towards the front section, the tip of said reservoir passing through said aperture, when said push bar is again depressed, said cam also being pushed over one tooth and moves back, the tip of one of said one reservoir (20*a*) retracting within said front section, when the push bar is again pushed, said rotary cam will have turned one tooth and said blocking section (62, 62*a*) will then engage said other reservoir (20*b*), joint member (25*b*) and repeat the sequence.

3,989,390

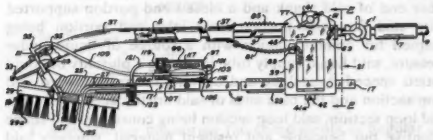
CAR-WASH DEVICE

Robert H. Thorner, 32237 Willoughby, Farmington Hills, Mich. 48024

Continuation of Ser. No. 299,037, Oct. 19, 1972, abandoned. This application Mar. 14, 1975, Ser. No. 558,533

Int. Cl.² A46B *11/04*

U.S. Cl. 401—42 **49 Claims**



1. A manually-operated device for cleaning the surface of a car in a car-washing process in which a source of pressurized water is supplied through a flexible hose, said car-washing process including an initial dirt run-off operation using at least said water, a washing operation using soap and water and a rinse operation using said water, the combination comprising: wand means operatively connected to said hose and including a rigid tube-portion having jet means at the end thereof for discharging water at high velocity, and including another portion adapted to be manually held by the operator of said device; said wand means being constructed and arranged to be used alone and independently by said operator during said initial run-off operation to direct said high-velocity water onto said car-surface for removing hydraulically a large portion of said dirt prior to said washing operation; brushing means operatively associated with said wand means for loosening the remaining portion of said dirt on said car-surface during said washing operation; attachment means for operatively connecting said brushing means to said wand means for enabling said last two means to operate as an integral unit during said washing operation; said attachment means including manually-operated quick-clamp means for enabling said operator to quickly attach said brushing means to said wand means and to quickly remove said brushing means therefrom for rapidly cleaning said car in said process; means to supply continuously a small quantity of water to the area of said brushing means; and soap-supply means operatively associated with said brushing means to discharge soap automatically to the area of said brushing means for mixing with said small quantity of water to help said loosening of said remaining dirt-portion during said washing operation.

3,989,391

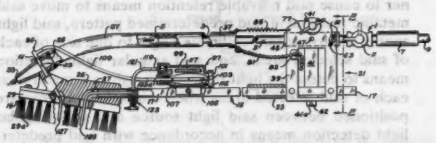
CAR-WASH DEVICE

Robert H. Thorner, 32237 Willoughby, Farmington Hills, Mich. 48024

Continuation of Ser. No. 326,964, Jan. 26, 1973, abandoned. This application Feb. 10, 1975, Ser. No. 548,397

Int. Cl.² A46B *11/06*

U.S. Cl. 401—43 **50 Claims**



1. In a manually-operated device for cleaning the surface of a car in a car-washing process in which a source of pressurized water is supplied through a flexible hose, said car-washing process including at least a washing operation and a rinse operation, wand means operatively connected to said hose and including a rigid tube-portion having jet means at the end thereof for discharging water at high velocity, and including another portion adapted to be manually held by the operator of said device, the combination comprising: brushing means operatively associated with said wand means for loosening the dirt on said car-surface during said washing operation; soap-supply means operatively associated with said brushing means to provide a flow of soap to the area of said brushing means; and said soap-supply means including means sensing the pressure of the water after discharging from said jet means to cause said flow of soap.

3,989,392

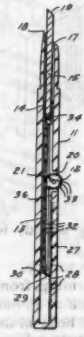
DISPENSING DEVICE

David Seidler, Forest Hills, N.Y., assignor to Revlon, Inc., New York, N.Y.

Filed Jan. 21, 1975, Ser. No. 542,833

Int. Cl.² B43K *21/88*

U.S. Cl. 401—66 **2 Claims**



1. A device for dispensing material in stick form and retracting the material into the device when not in use, comprising a housing which houses a gear wheel held in a lateral opening in one side of the housing, said gear wheel being provided with teeth which engage rack teeth on an elevator fitting into a cup

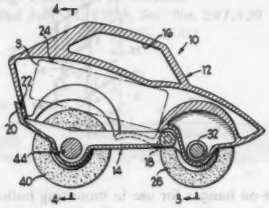
holding the material being dispensed, said elevator and cup being retained inside the housing and being separable; the inner surface of the side of the housing having the lateral opening being provided with a series of rack teeth in a longitudinal direction, said rack teeth engaging a pawl extending from and in integral construction with the elevator on the same side of the elevator as its rack teeth, the end of the elevator from which the pawl extends being angled in the direction of the pawl and containing a cutout before the pawl on the same side as the pawl said pawl being movable so that it bends in a direction opposite to the movement of the elevator.

3,989,393

SCRUBBING DEVICE

Mitchell J. Frumkin, and Albert G. Keller, both of Chicago, Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Aug. 13, 1975, Ser. No. 604,445
Int. Cl.² A47L *13/16*; A47K *7/02*
U.S. Cl. 401—208 **9 Claims**



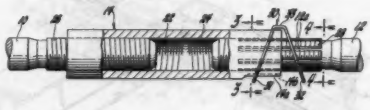
1. A scrubbing device, comprising:
a frame having an interior compartment for receiving a cake of soap;
first scrubbing roller means rotatably mounted on the frame for engaging and scrubbing a surface to be cleaned, said roller means being engageable on the back side thereof with the cake of soap in said compartment for transferring soap from the cake to said surface;
second scrubbing roller means rotatably mounted on the frame for engaging and scrubbing said surface; and
access means for movably mounting said first scrubbing roller means to provide access to said interior compartment for replacing the cake of soap.

3,989,394

STEERING LINKAGE ADJUST RETAINER

Carl H. Ellis, Lansing, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 29, 1975, Ser. No. 626,731
Int. Cl.² F16B *7/00*
U.S. Cl. 403—46 **4 Claims**



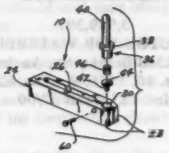
1. An adjustable tie rod assembly comprising a tubular sleeve internally threaded at opposite ends, said sleeve having an anti-rotation means thereon including at least a radial extending aperture means adjacent one end thereof and a flat on the exterior of said sleeve adjacent said one end with said aperture means extending radially inward from said flat, a first tie rod, threaded at one end, adjustably received in one end of said sleeve in threaded engagement therewith, a second tie rod, threaded at one end, adjustably received in the opposite end of said sleeve in threaded engagement therewith, said first tie rod having a plurality of axially extending spaced apart spline grooves thereon adjacent said one end, and a retainer means having means at one end thereof engaging said anti-rotation means of said sleeve to prevent rotation of said retainer means relative to said sleeve and having spline engaging tab means at its other end engaging at least one of said spline grooves of said first tie rod to lock said first tie rod against rotation relative to said sleeve, said retainer means being substantially C-shaped and of resilient material, said retainer means having a first arm and a second arm resiliently normally biased away from each other, said first arm having an oblong hole therethrough to receive said first tie rod, said hole providing radially inward extending protruding tab means forming said tab means engaging at least one of said spline grooves of said first tie rod, said second arm having a substantially round hole therethrough with a flat and one protruding tab to encircle said sleeve with said flat aligned with said flat on said sleeve and with said tab engaging said aperture means in said sleeve.

3,989,395

HOLDER FOR ADJUSTABLE MAGNETIZED DOWEL PIN STOP

Roscoe H. Simmons, Sr., 1817 Larnard Drive, Des Moines, Iowa 50317

Filed Dec. 2, 1974, Ser. No. 528,919
Int. Cl.² F16D *1/12, 3/00*
U.S. Cl. 403—110 **6 Claims**



1. An adjustable dowel pin stop comprising,
a dowel pin holder having a cavity,
a dowel pin eccentrically positioned in a bushing,
said bushing rotatably positioned in said cavity,
means on said bushing for selectively adjustably rotating said bushing and said dowel pin, and
said holder including a spring-loaded locater pin on the bottom side thereof and said locater pin normally extending downwardly and outwardly to be received in a locater hole and being adjustable to be depressed upwardly and inwardly into said holder.

3,989,396

STEEL BOX-COLUMN FOR STEEL STRUCTURES

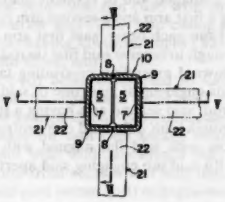
Tsutomu Matsumoto, Mitaka, and Asao Yamamoto, Musashino, both of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation of Ser. No. 257,657, May 30, 1972, abandoned. This application Oct. 28, 1975, Ser. No. 626,447
Int. Cl.² E04C *3/32*
U.S. Cl. 403—174 **4 Claims**

1. A stress transmitting steel structure comprising:
a rectangular steel box-column comprising:
a pair of steel channel members each having a web portion and two flanges, one flange depending from each edge of said web portion;
a plurality of substantially rectangular beam column connection diaphragms positioned within each of said steel channel members, each said connection diaphragm being welded along three edges thereof to the respective steel channel member, with two opposite

edges welded to said flanges of said respective steel channel member, and an edge between said two opposite edges welded to said web portion of said respective steel channel member; and

said pair of steel channel members being aligned with said flanges thereof facing each other and with each of said connection diaphragms of one steel channel member facing a corresponding connection diaphragm of the



other steel channel member, said steel channel members being welded together at the ends of their adjacently positioned flanges; and

plural beams, each said beam having a web with flanges at opposite edges thereof, each said beam having an end thereof welded to an exterior face of said rectangular steel box-column, with each said beam flange aligned with one of said connection diaphragms.

3,989,397

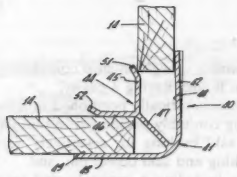
CORNER CONNECTOR FOR WATERBED PEDESTALS

Richard M. Baker, 1368 Berkley St., Anaheim, Calif. 92804

Filed Oct. 16, 1975, Ser. No. 623,096

Int. Cl.² A47B *57/00*

U.S. Cl. 403—205 **1 Claim**



1. In a right-angle connector for rigidly joining the ends of two board members of the type including first and second generally L-shaped plates, each having first and second sides, and means connected between the intersections between said first and second sides of said first and second plates for connecting said second plate within the angle defined by said first plate with said first and second sides of said first plate in generally parallel, spaced-apart relationship to said first and second sides, respectively, of said second plate to define respective first and second open-ended channels for receipt of said ends of said board members, the improvement wherein:

said first sides of said plates are non-parallel and said second sides of said plates are non-parallel, the spacing between adjacent sides at the bases of said channels being approximately equal to the thickness of said board members and the spacing between adjacent sides at the entrances of said channels being slightly less than the thickness of said board members;

said first and second sides of said second plate are perpendicular;

said first and second sides of said first plate are positioned at an acute angle of slightly less than 90°; and

the ends of said first and second sides of said second plate are bent away from said first and second sides, respectively, of said first plate, adjacent said entrances to said channels, to provide enlarged openings at said entrances which are slightly greater than the thickness of said board members whereby said ends of said board members may be forced into said channels and said sides of said plates frictionally engage and retain the sides of said board members.

3,989,398

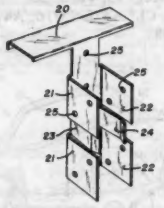
CLIP-ON ATTACHMENT MEMBERS FOR STRUCTURAL STEEL JOISTS

Alan C. Wendt, Barrington, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Jan. 6, 1975, Ser. No. 538,692

Int. Cl.² F16B *5/00*

U.S. Cl. 403—232 **2 Claims**



1. A clip-on hanger for use in mounting hollow metal joists perpendicular to headers and the like, said clip-on hanger comprising a U-shaped top support having a depending back plate depending from a portion thereof, said depending back plate having at opposing sides thereof perpendicularly outwardly extending side flanges with at least one of said side flanges having a central portion thereof slightly bent out of the plane of the remainder of the side flange thereby permitting the hanger to be hung over one structural member while the side flanges are clipped to another structural member for attachment thereto.

3,989,399

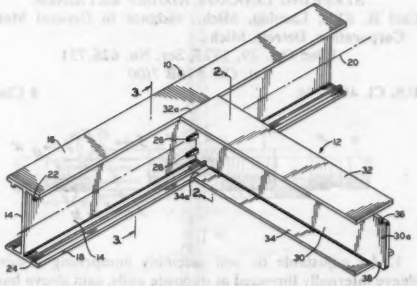
STRUCTURAL JOINT ASSEMBLY

Joseph A. Slowbe, 3189 W. 73rd St., Cleveland, Ohio 44102

Filed Oct. 4, 1974, Ser. No. 512,340

Int. Cl.² B25G *3/00*; **F16B** *9/00*; **F16L** *41/00*

U.S. Cl. 403—245 **24 Claims**



1. A structural joint assembly comprising, a first member including wall means defining a channel having a longitudinal axis and an open side, a second member having end means and a longitudinal axis at an angle with respect to said channel axis, said end means including plate means in said channel and having opposite sides in the direction of siad channel axis, at

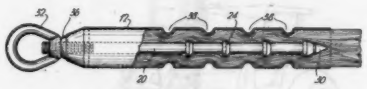
least one pair of resilient tabs on said wall means, said tabs having first ends fixed with respect to said wall means and second ends within said channel spaced apart in said direction and receiving said opposite sides of said plate means therebetween to restrain displacement of said second member longitudinally of said first member, at least one tab of said pair of resilient tabs being inclined for the first and second ends of said one tab to be spaced apart in the direction of said channel axis, and said one tab being displaceable laterally of said channel axis by said plate means of said second member to permit movement of said plate means longitudinally of said channel into position between said second ends of said pair of tabs, and means interengaging said plate means and wall means against separation of said members in the direction outwardly of said open side.

3,989,400

PULLING EYE

Jackson A. Smith, Bradner, and Edgar D. Perusse, Aldergrove, both of Canada, assignors to Rank Industries Ltd. and Perusse Holdings Ltd., both of, Canada

Filed July 21, 1975, Ser. No. 597,930
Int. Cl.² F16G *11/05*
U.S. Cl. 403—275 **3 Claims**



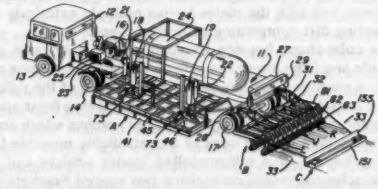
1. A pulling eye assembly for attachment to a terminal end of a communication cable, said assembly comprising an elongated metal sleeve open at one end to accommodate said cable and closed at the other end; a block member welded in and constituting the closed end of the sleeve; a spigot, having a plurality of barbs spaced throughout its length, secured to said block and positioned concentrically within said sleeve; and a pulling eye interconnected with said spigot and positioned outwardly of the closed end of the sleeve, the said sleeve being adapted to be circumferentially crimped between said barbs when the spigot has been driven into the end of said cable, said block being concentrically drilled and threaded to threadably receive one end of said spigot.

3,989,401

SURFACE TREATING APPARATUS

Frank F. Moench, P.O. Box 6484, Station B, Albuquerque, N. Mex. 87107

Filed Apr. 17, 1975, Ser. No. 568,940
Int. Cl.² E01C *23/14*
U.S. Cl. 404—95 **24 Claims**



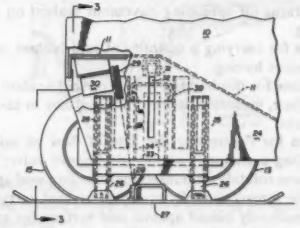
21. In a surface treating apparatus, the combination comprising a hood and burner assembly having
a hood with a top wall portion, front wall portion, a pair of opposed spaced side walls, a rear wall that forms an inner combustion chamber open at the bottom adapted for overlying and being spaced from a surface to be heated, a roof of said top wall being tapered downwardly toward the rear wall along the inside so that the combustion chamber gradually decreases in volume toward the rear wall for uniformity of heating of the surface,
said front wall having a plurality of laterally spaced burner ports,
said hood having an outer skeletal support frame and inner liner,
said outer support frame having
a top frame portion including laterally spaced, longitudinal members and spaced cross members connected at the end with the longitudinal members,
side frame portions including an upper and a lower longitudinal member,
front frame portions including upper and lower lateral members and spaced upright connecting members,
rear frame portions including upper and lower lateral members and spaced upright connecting members,
said inner liner including a plurality of adjacent, heat radiating liner members
each said liner member having
a backing plate
a refractory position on one face of said backing plate, said refractory position having
a top face,
a bottom face,
four vertical faces with each adjacent vertical faces at right angles to one another, and
a notch formed in a top face along each vertical face forming a stepped face
adjacent liner members having facing notches forming a gap that is wider at the top and inwardly stepped to be narrower at the bottom, and
the wider portion of said gaps being filled with a glazing composition
a plurality of burners mounted at the front wall portion of said hood, each burner adjacent an associated burner port for directing a flame into the inside of the combustion chamber to heat the liner and reflect heat in the infrared region onto the surface below the combustion chamber,
a main section,
a pair of opposed side section pivotally connected to the main section to swing between a lower working position wherein they form a lateral extension of the main section and a raised transport position disposed above and substantially within the lateral extremity of the main section.

3,989,402

PAVING MACHINE WITH THICKNESS AND LEVELING CONTROL

W. Thomas James, III, Youngstown, Ohio, assignor to The Renner Company, Youngstown, Ohio

Continuation-in-part of Ser. No. 391,882, Aug. 27, 1973, abandoned. This application Feb. 6, 1975, Ser. No. 547,548
Int. Cl.² E01C *19/18*
U.S. Cl. 404—110 **6 Claims**



1. The combination of a towed paving machine and grade sensing and control means therefor, the machine comprising; an undercarriage, a plurality of support wheels beneath said undercarriage, an elongated transverse beam in said undercar-

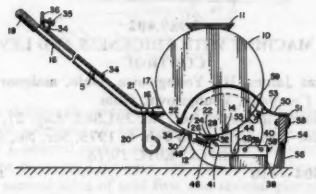
riage, said transverse beam being attached to said support wheels and essentially U-Shaped in cross-section having a base and a pair of legs which are curved outwardly of said base, a hopper located above said undercarriage and beam, pairs of spaced vertical guides located on opposite ends of said hopper to define guide channels therebetween into which the ends of said transverse beam are received with said outwardly curved legs tangentially and slidably contacting said vertical guides so that said transverse beam is slidably received in said guide channel in a manner such that said beam can rotate about the longitudinal axis thereof, a plurality of frame members attached to said transverse beam, and extendible devices connecting said transverse beam and said hopper, said extendible devices each having one end thereof pivotally connected to a bracket on said hopper and the other end thereof connected to one of said frame members, a screed, pivots attaching said screed to said hopper adjacent a material depositing opening in said hopper, adjustable means on said hopper engaging said screed in spaced relation to said pivots for changing the angle of attack of said screed relative to said hopper and a power source mounted on said hopper for said extendible devices, said transverse beam being slidably and rotatably received in said guide channels enabling said hopper and screed to be moved vertically and tilted from front to back relative to said undercarriage as said machine is towed over a surface to be paved thereby; said sensing and control means being on said hopper and comprising skis movably supported on said hopper and engaging said surface to be paved, means on said hopper connected to said skis for emitting a signal, secondary means controlling said power source with respect to said extendible devices and the hopper and screed to change the angle of attack of the hopper and screed responsive to movement of the skis due to deviation in the grade of said surface to be paved.

3,989,403

APPARATUS FOR SPREADING PAVEMENT SEALANT

Alphonse Verive, Harrison, Ark., assignor to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed June 6, 1975, Ser. No. 584,461
Int. Cl.² E01C *19/18*
U.S. Cl. 404—111 **8 Claims**



1. Apparatus for spreading pavement sealant on a surface, comprising:

a. means for carrying a quantity of said sealant, said carrying means having;

1. means for discharging a flow of said sealant onto said surface, including at least one aperture in said carrying means;

2. means for controlling the rate of flow of said sealant, including a manually actuatable flopper valve; and

3. means rotatably mounted for wheeling said apparatus;

b. flexible means pivotally mounted on said carrying means and resiliently biased against said surface for spreading a layer of said discharged sealant over said surface;

c. means pivotally mounted on said carrying means and resiliently biased against said surface for brushing said layer of sealant evenly over said surface;

d. means for limiting the travel distance of said spreader means toward said surface;

e. means for limiting the travel distance of said brush means toward said surface; and

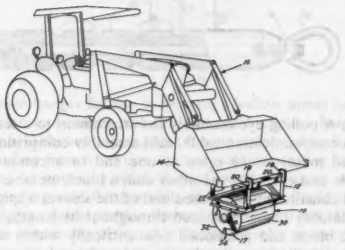
f. rigid handle means connected for allowing manual pulling of said apparatus along said surface, whereby when said handle is in a first vertical position said spreader means and said brush means are resiliently biased against said surface for spreading sealant, and when said handle is in a second vertical position said spreader means and said brush means are held away from said surface by the respective said brushing means so that said apparatus may be freely wheeled about when not being used for spreading sealant.

3,989,404

DIRT COMPACTING AND ASPHALT COMPACTING ROLLER UNIT

Carl Burton, 1966 S. University Blvd., Denver, Colo. 80210

Filed July 28, 1975, Ser. No. 599,895
Int. Cl.² E01C *19/00*
U.S. Cl. 404—128 **3 Claims**



1. A dirt compacting and asphalt compacting roller unit of sufficient weight for utilization in compacting fill dirt introduced into a ditch to fill the ditch, and for utilization in compacting hot asphalt subsequently applied over the previously compacted dirt, the roller unit comprising:

a. a smooth-surface circumference drum shape roller with concentrically positioned shaft protruding laterally on each side and rotatably attached at each shaft protrusion to a housing frame, with the roller having three attached detachable plates which are arc-shaped to fit against the smooth-surface circumference of the roller and which each cover one-third of said smooth-surface circumference, and with the plates having multiple exteriorly projecting dirt compacting protrusions; and

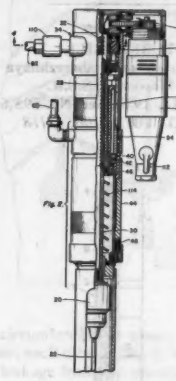
b. a cube-shape housing frame rotatably holding at each side and from above the roller's laterally protruding shaft in a manner to permit essentially one-half of the roller to be outside the frame, with the frame having front attachment means comprising two spaced notches which accept the leading bottom edge of a controllably movable loading bucket of a self-propelled loader vehicle and rear attachment means comprising two spaced brackets each having a key-shape opening therein to receive and secure a respective chain secured atop the rear of the loading bucket, and with the frame also housing a tank for water and a water transmission line therefrom to manually selectively permit the flow of water from above over the roller along the roller's width, and with the frame additionally housing a scraper brush and blade assembly and a scraper blade assembly, each assembly manually spring pressurable against the roller.

3,989,405

TOOL FEEDING DEVICE HAVING SIGNAL CONTROL FEED CLUTCH

Robert C. Quackenbush, 1330 Beaudry Blvd., Glendale, Calif. 91208

Filed Mar. 3, 1975, Ser. No. 555,080
Int. Cl.² B23B 39/04
U.S. Cl. 408—11 16 Claims



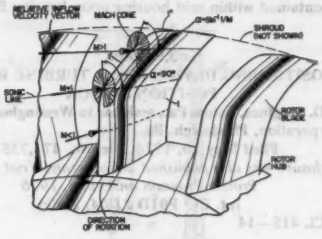
1. In a tool feeding device for feeding a constantly rotating tool in feed and retraction strokes, said tool being of the type having cooperable lead screw and nuts operably connected moving said tool without regard to said tool constant rotation in said feed stroke during lead screw and nut relative rotation therebetween and at least permitting movement of said tool still without regard to said tool constant rotation in said retraction stroke upon lead screw and nut lack of relative rotation therebetween, the combination of: drive means operable for producing driving rotation; drive train means operably connected to said drive means and operably connected transmitting rotation to said lead screw and nut for producing said relative rotation in carrying out a normal tool feed stroke, said drive train means rotation transmission to said lead screw and nut being independant of any rotation transmission to said tool; rotatable clutch means in said drive train means operably connected transmitting normal rotational forces therethrough for said lead screw and nut relative rotation in said normal tool feed stroke and therefore normal tool axial feed thrust in said normal tool feed stroke, said clutch means comprising a rotatable clutch member automatically retained in an engaged position during said clutch means normal rotational force transmission and automatically moving axially to a disengaged position interrupting said clutch means normal rotational force transmission upon an abnormal axial thrust resistance to said normal tool feed stroke reacting reversely through said lead screw and nut to said clutch means tending to abnormally resist rotation transmission through said clutch means; signal means movable between first and second control positions operably connected to said clutch means moving from said first to said second control position upon said clutch member moving axially from said engaged to said disengaged position.

3,989,406

METHOD OF AND APPARATUS FOR PREVENTING LEADING EDGE SHOCKS AND SHOCK-RELATED NOISE IN TRANSONIC AND SUPERSONIC ROTOR BLADES AND THE LIKE

Donald B. Bliss, Belmont, Mass., assignor to Bolt Beranek and Newman, Inc., Cambridge, Mass.

Filed Nov. 26, 1974, Ser. No. 527,499
Int. Cl.² F01D 5/12
U.S. Cl. 415—1 11 Claims



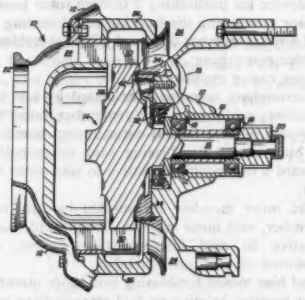
8. A method of preventing leading-edge shock and shock-related noise in transonic and supersonic airflow over a blade and the like, that comprises, orienting the blade generally in the direction of airflow, rendering the airflow relative to the blade supersonic from a predetermined intermediate leading-edge region of the blade to the tip edge thereof, and sweeping the contour of said blade along at least part of the region of supersonic airflow at an acute angle to said direction less than substantially $\sin^{-1} 1/M$, where M is the Mach number of the supersonic flow, and small enough to insure that the contour of the successive portions of the blade over the region of supersonic flow lies inside the Mach cone of resultant flow velocity over the blade thereat.

3,989,407

WHEEL CONTAINMENT APPARATUS AND METHOD

Thomas H. M. Cunningham, Phoenix, Ariz., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Apr. 30, 1975, Ser. No. 573,271
Int. Cl.² F01D 21/04
U.S. Cl. 415—1 17 Claims



1. In combination:
a housing having a fluid duct for carrying fluid flow through the housing;
a turbine wheel in the housing having peripherally disposed blades interposed in said duct;
bearing means for rotatably mounting said wheel in the housing, said wheel tending to shift axially in the housing upon failure of said bearing means;

a containment ring secured to said housing in normally axially aligned, peripherally surrounding relationship to said wheel, said ring operable upon said bearing failure to contain within said housing, fragments of said wheel thrown centrifugally therefrom while said wheel is generally axially aligned with said ring; and

severing means rigidly secured to said housing adjacent and axially spaced from said wheel, said severing means operable upon said axial shifting of the wheel to engage the latter and sever said blades while the blades are generally axially aligned with said ring to assure that said blades are contained within said housing upon bearing failure.

3,989,408

POSITIONING DEVICE FOR A TURBINE ROTOR POSITION SENSOR

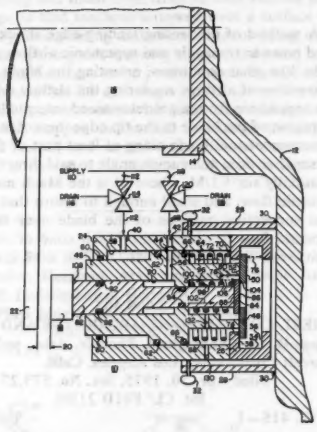
Karl O. Jaegtnes, Aston, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 20, 1974, Ser. No. 471,735

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² F01D *21/04, 21/06*

U.S. Cl. 415—14 **4 Claims**



1. A device for positioning a turbine rotor position sensor, said sensor monitoring the location and detecting axial movement of a rotor member disposed within a turbine apparatus, said device comprising:

an outer casing member,

an intermediate member surrounded by said outer casing member, said intermediate member being rectilinearly movable relative to said outer casing member,

first bias means for biasing said intermediate member toward a first position relative to said outer casing member,

a solid inner member surrounded by said intermediate member, said inner member being rectilinearly movable relative to said intermediate member, said sensor mounted on said inner member,

second bias means for biasing said inner member toward a first position relative to said intermediate member, said sensor being disposed a predetermined distance from said rotor member,

first displacement means for displacing said intermediate member from said first position relative to said outer casing member to a second position relative to said outer casing member, said inner member remaining in said first position relative to said intermediate member during said displacement of said intermediate member relative to said outer casing member, said predetermined distance between said sensor and said rotor member being changed by said displacement of said intermediate member relative to said outer casing member,

second displacement means for displacing said inner member from a first position relative to said intermediate member to a second position relative to said intermediate member, said intermediate member remaining in said first position relative to said outer casing member during said displacement of said inner member relative to said intermediate member, said predetermined distance between said sensor and said rotor being changed by said displacement of said inner member relative to said intermediate member.

3,989,409

TURBODRILL

Rolen Arsenievich Ioannesian, Naberezhnaya Tarasa Shevchenko, 1/2, kv. 49, Moscow, U.S.S.R.

Filed July 14, 1975, Ser. No. 595,681

Int. Cl.² F01D *3/00, 25/18*

U.S. Cl. 415—107 **5 Claims**

1. A turbodrill comprising: a body; a turbine having rotors for generating a torque and a hydraulic load, and stators; thrust bearing means taking the reaction of a bottom hole; a shaft installed in said body on said thrust bearing means and built up of a number of consecutively connected sections and carrying said rotors; additional thrust bearing means taking a hydraulic load, mounted on said shaft; means transmitting torque from one shaft section to another and capable of elastic deformation for relieving said additional thrust bearing means from hydraulic load and transmitting the latter to said thrust bearing means taking the reaction of the bottom hole.

3,989,410

LABYRINTH SEAL SYSTEM

Bartolomeo Joseph Ferrari, Topsfield, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Nov. 27, 1974, Ser. No. 527,748

Int. Cl.² F01D *5/20, 11/02*

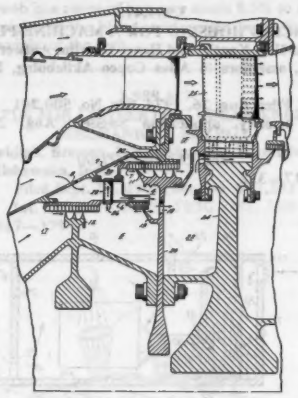
U.S. Cl. 415—115 **7 Claims**

1. An improved gas turbine engine comprising a compressor, combustor, and gas turbine in serial flow relation, a rotor drivably connected to the gas turbine for driving the compressor, a first annular chamber for retaining cooling air, and a gas accelerator providing accelerated cooling air to the first chamber having an input in flow communciation with the compressor, and an output in flow communication with the first chamber, wherein the improvement comprises:

a system of labyrinth seals for sealing the first chamber against leakage to and from adjacent areas of differing

pressure, each seal having a toothed member in rotating engagement with a fixed runner;

flow passage means for causing the leakages of all the seals to flow to a point between the teeth of a first one of the seals wherein the flow passage means includes a plurality



of tubes circumferentially spaced about the input to the accelerator, each tube having an inlet disposed to receive parasitic leakage from the remaining seals and an outlet in flow communication with at least one aperture in the runner of the first seal.

3,989,411

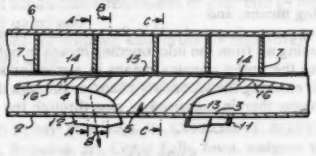
SILENCING VANE FOR TOROIDAL BLOWER

Andrew Henry Middleton, Southampton, England, assignor to British Gas Corporation, England

Filed July 14, 1975, Ser. No. 595,743

Int. Cl.² F04D *5/00*

U.S. Cl. 415—213 T **8 Claims**



1. A peripheral toroidal blower of the kind comprising a toroidal chamber which is divided along a plane at right angles to its axis into a part bounded by a stator housing having adjacent inlet and outlet ports with a stripper block disposed between them and a part bounded by a rotor housing containing a series of impeller blades, characterized in that the stripper block comprises a solid block part whose central cross-section corresponds to the cross-section of the hemi-toroidal stator in which the stripper block is disposed, and two shaped vanes projecting one from each end of the block part and extending in opposite directions around the toroidal chamber so that said vanes at least partially cover the inlet and outlet ports respectively end, are spaced therefrom and said vanes having face tip ends the width of each vane gradually diminishing from its root connection with the block part of the stripper block to its free tip end.

3,989,412

COOLED ROTOR BLADE FOR A GAS TURBINE

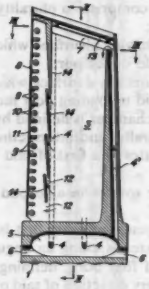
Dilip Mukherjee, Winterthur, Switzerland, assignor to Brown Boveri-Sulzer Turbomachinery, Ltd., Zurich, Switzerland

Filed June 17, 1975, Ser. No. 587,668

Claims priority, application Switzerland, July 17, 1974, 9824/74

Int. Cl.² F01D *5/18*

U.S. Cl. 416—97 R **7 Claims**



1. A cooled rotor blade for a gas turbine having

a root including a first cooling chamber therein;

a hollow unitary shell integrally connected with and extending from said root, said shell defining a blade tip at an end opposite said root, a trailing edge along one side and an internal cavity, said shell being of uniform thickness in any cross-section transverse to the longitudinal axis of said blade;

a cover secured to said shell at said blade tip;

a second cooling chamber in said blade tip communicating with said cavity;

a plurality of ducts in said shell distributed uniformly over the periphery of said shell and extending from said first chamber to said second chamber;

a plurality of outlets in said shell in the region of said trailing edge and extending along said side; and

a plurality of passages within said shell communicating said cavity with said outlets.

3,989,413

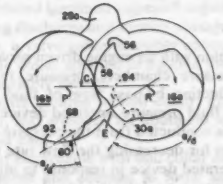
GAS COMPRESSOR UNLOADING MEANS

Wallace A. McGahan, Lawrenceville, N.J.; Paul D. Webb, Tioga, Pa., and Henry W. Morse, Savona, N.Y., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed May 14, 1975, Ser. No. 577,347

Int. Cl.² F04B *49/02;* **F01C** *1/18, 21/16;* **F04C** *17/10*

U.S. Cl. 417—310 **12 Claims**



1. In a rotary gas compressor having a compression chamber, chamber-confined rotary means for displacing and compressing gas in said chamber, and spaced-apart gas inlet and outlet ports in communication with said chamber; unloading means for the compressor, comprising:

unloading port means, spaced apart from said inlet and outlet ports, opening both into said chamber and externally of said compressor; and

valving means coupled to said unloading port means operative for opening and closing said unloading port means to a conduct of gas therethrough; wherein

said compression chamber is defined by arcuate side walls and end walls joined to said side walls;

said unloading port means is formed in at least one of said end walls;

said outlet port is formed in at least one of said end walls;

said rotary means comprises a plurality of cooperating and co-acting rotors;

one of said rotors having a surface which cyclically exposes and occludes said outlet port;

another of said rotors has a surface which cyclically exposes and occludes said unloading port means;

said compression chamber is defined by a plurality of axially-extending, parallel and intersecting bores;

said one rotor rotates in a first of said bores about the axis thereof;

said another rotor rotates in a second of said bores about the axis thereof;

said outlet port opens onto said first bore;

said outlet port extends along an angular arc; drawn from said axis of said first bore, defining of said outlet port, relative to a rotary direction of said one rotor, leading and trailing portions, said trailing portion having a trailing edge; and

said outlet port being located, relative to said unloading port means, such that a radial line drawn from said axis of said first bore and through the radially outermost portion of said trailing edge will substantially bisect said unloading port means.

3,989,414

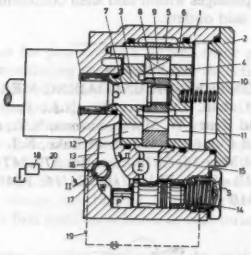
PUMP FOR SERVO STEERING

Roland Rieber, Mogglingen, and Rolf Fassbender, Mutlangen, both of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed Mar. 26, 1975, Ser. No. 562,240

Int. Cl.² F04B *49/00*

U.S. Cl. 417—300 **5 Claims**



1. In combination with an engine driven servo pump having suction and pressure chambers, pressure regulating valve means for conducting by-pass flow of fluid between said chambers and a fluid pressure operated device to which fluid under pressure is conducted from the pressure chamber; flow regulating means for decreasing the flow rate of said fluid to the pressure operated device in response to increase in speed of the engine above a predetermined value, comprising pressure channel means establishing a flow path along which unthrottled flow of the fluid is conducted from the pressure chamber to the pressure regulating valve means, and orifice flow means mounted in the pressure channel means independently of the pressure regulating valve means for conducting a continuous throttled flow of fluid to the pressure operated device as a function of the flow rate, said orifice flow means comprising a throttle member projecting into the flow channel means to establish a reduced static pressure region along said flow path, said throttle member having an orifice passage exposed to the fluid in the flow channel means in said reduced static pressure region.

3,989,415

SILENCING HOUSING FOR A MACHINE PLANT

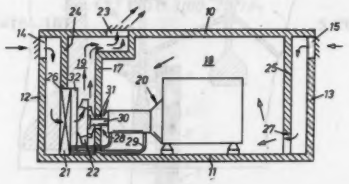
Michel Van-Hee, Kontic, and Henri Ysewijn, Antwerp, both of Belgium, assignors to Atlas Copco Aktiebolag, Huddinge, Sweden

Filed Aug. 26, 1974, Ser. No. 500,201

Claims priority, application Sweden, Aug. 27, 1973, 7311576

Int. Cl.² F04B *21/00*

U.S. Cl. 417—312 **7 Claims**



1. A silencing housing for surrounding a machine having at least one external cooler comprising:

enclosing means defining a primary chamber and a secondary chamber,

the primary chamber and secondary chamber communicating with one another,

the primary chamber enclosing the machine,

the enclosing means having a plurality of air inlet opening means and at least one air outlet opening means,

The opening means being provided with sound trapping means,

the secondary chamber containing the machine cooler,

the secondary chamber having at least one of the air inlet opening means and the outlet opening means of the enclosing means,

the primary chamber having at least one of the air inlet opening means, and

ventilator means disposed within the secondary chamber for conveying air from the inlet opening means in both chambers to the outlet opening means in a manner such that the air entering the secondary chamber through the opening means therein is caused to pass through the cooler.

3,989,416

DENSE PAPER AND METHOD OF MANUFACTURING

William G. Louden, Erwinna, Pa. 18920

Continuation-in-part of Ser. No. 397,220, Sept. 14, 1973, abandoned. This application Apr. 3, 1975, Ser. No. 564,780

Int. Cl.² C08F *29/54*; D21H *1/28*; B44D *1/44*

U.S. Cl. 427—361 **6 Claims**

1. A process for manufacturing dense paper comprising the steps, performed in the following sequence, of:

advancing a web of paper having a dry uncalendered density between opposite surfaces in a range of between about 7 to about 11 lbs/mil;

impregnating the advancing web by applying to both of said surfaces an excess amount of an aqueous dispersion containing a blend of a rigid polymeric material and an inorganic filler, said blend consisting essentially of from about 35 to about 90% of said polymeric material and from about 10 to about 65% of said inorganic filler, said percentages being by weight based on the weight of the

blend, said rigid polymeric material having a glass transition temperature in a range of between about 15 to about 60° C., and

passing said advancing web between opposed squeeze rolls to ensure penetration of said web by said dispersion and to remove excess dispersion from said surfaces; and

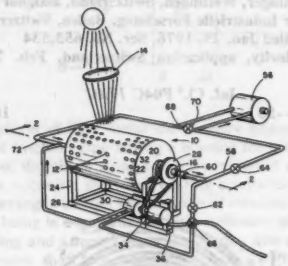
heating said web after it passes between said rolls and said excess dispersion has been removed to fuse said blend in said web in a range of between about 8.5% to about 50%, by weight, of the blend, said weight being based on the dry weight of the web.

3,989,417

APPARATUS FOR CONVERTING SOLAR ENERGY INTO MECHANICAL ENERGY

Robert Neidigh, Bremen, Ind., assignor to Wheelabrator-Frye, Inc., Mishawaka, Ind.

Filed Sept. 15, 1975, Ser. No. 613,253
Int. Cl.² F04B *17/00*; **F03G** *7/02*, *7/06*
U.S. Cl. 417—379 **15 Claims**



1. A solar powered device for pressurizing fluid from a reservoir into an accumulator for operating hydraulic devices comprising:

a. a base;

b. a drum, having a reservoir and an accumulator disposed therein, rotatably supported on said base;

c. a plurality of solar actuated pump units disposed on said drum and communicating with said reservoir and said accumulator for pressurizing fluid from said reservoir into said accumulator responsive to solar energy impinging on said units; and

d. means for rotating said drum to repetitively cycle said pump units.

3,989,418

FLUID PUMP FOR USE IN EXPLOSIVE BORE HOLES

Floyd R. Swanson, Jr., Cedar Falls, Iowa, assignor to Swanson Engineering Inc., Cedar Falls, Iowa

Filed May 18, 1973, Ser. No. 361,496
Int. Cl.² F04B *17/00*
U.S. Cl. 417—405 **4 Claims**

1. A fluid pump for use in explosive bore holes comprising,

an elongated first housing having upper and lower ends, said first housing having means provided thereon to permit water to enter the interior thereof,

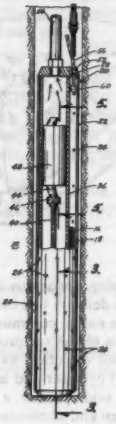
a hydraulic motor secured in said housing adjacent the lower end thereof, a pump housing extending upwardly from said hydraulic motor within said first housing,

a hydraulic hose means in communication with a source of hydraulic fluid under pressure and extending downwardly into said first housing between said first housing and said pump housing, said hose means being fluidly connected to said hydraulic motor,

a drive shaft extending upwardly from said hydraulic motor within said pump housing,

a pump stator means positioned in said pump housing,

a pump rotor means connected to said drive shaft for rotation therewith and extending through said pump stator means,



a discharge line fluidly connected to said pump housing so that water in the bore hole will be pumped upwardly through said discharge line upon actuation of said hydraulic motor,

and a flexible cable secured to the upper end of said first housing and extending upwardly therefrom for pulling said fluid pump from the bore hole.

3,989,419

VALVE GUIDE FOR POPPET VALVE

Curtis Jess Parker, Orangefield, and Kenneth Harmon McGill, Beaumont, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed July 25, 1975, Ser. No. 599,201
Int. Cl.² F04B *39/10*, *39/14*
U.S. Cl. 417—454 **6 Claims**

1. In a reciprocating pump having a fluid end with reciprocating spring-biased stemmed valves arranged for alternatively communicating discharge and suction passages with a pumped fluid chamber, a valve guide assembly comprising:

a valve guide collar adapted to receive the stem of a valve member slidably therein;

a support plate secured to said collar, extending outward therefrom, and arranged for abutment with ledges in the pump fluid end;

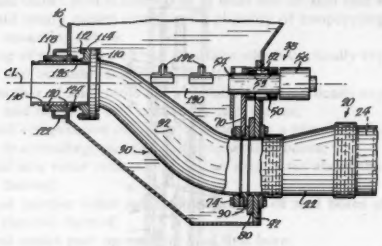
a support bar engageable with said collar and the wall of the fluid chamber and adapted to force said support plate into tight abutment with ledges in the fluid end; and,

wherein said guide collar comprises a cylindrical tubular sleeve having an open valve stem end and a relatively closed end, with a transverse slot through said relatively closed end adapted for relatively snug fitting engagement of said support bar therein.

3,989,420
CONCRETE PUMPING APPARATUS

Engene Taylor, Kenosha, Wis., assignor to J. I. Case Company, Racine, Wis.

Continuation-in-part of Ser. No. 470,069, May 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 398,203, Sept. 17, 1973, abandoned. This application Sept. 15, 1975, Ser. No. 613,334
Int. Cl.² F04B 15/02
U.S. Cl. 417—517 15 Claims

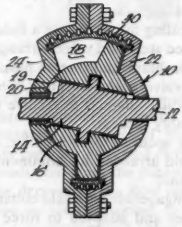


1. Concrete pumping apparatus comprising: a hopper for receiving concrete, a delivery line extending from said hopper, a cylinder having one end in communication with said hopper, said cylinder having a piston reciprocated therein, said piston being movable in one direction to withdraw concrete from said hopper into said cylinder and in an opposite direction to force concrete from said cylinder, a valve in said hopper, said valve having one open end connected to said delivery line and an opposite open end, drive means for reciprocating said valve between two positions, said valve connecting said cylinder to said delivery line in one position and placing said cylinder in communication with said hopper in the other position, said hopper having bearing housings supported by opposed walls thereof with said bearing housings having bearings supported therein and defining axially aligned openings, said valve including a rigid tube having a flange at said open end, and a sleeve rotatably supported in an opening defined by one of said bearing housings, said sleeve having a second flange secured to said first flange.

3,989,421
HOUSING CONSTRUCTION FOR SLANT AXIS ROTARY MECHANISM

James A. Ritchie, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 6, 1975, Ser. No. 601,890
Int. Cl.² F01C 1/02, 21/06; F04C 17/02, 29/04
U.S. Cl. 418—53 4 Claims

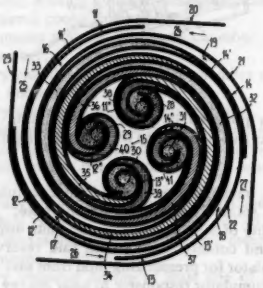


1. In a slant axis rotary mechanism including, a shaft having an angularly offset portion, a rotor journalled on said angularly offset portion, a rotor journalled on said angularly offset portion, said rotor having a peripheral flange with plural apices on each side of the flange, and a housing defining an operating chamber receiving said rotor and including an outer, spherical peripheral wall adapted to be sealingly engaged by sealing means carried by the periphery of said flange, and spaced, generally radially extending side walls adapted to be sealingly engaged by seals carried by said rotor apices, the improvement wherein said housing is defined by a pair of housing segments flanking said rotor, each segment having one of said radially extending side walls formed therein, and a liner having a spherical inner surface defining said outer spherical peripheral wall clamped between and backed by said housing segments, each said segment including a peripheral groove at the outermost extremity of the associated radially extending side wall, said liner being partly received in said grooves, said housing segments further including annular shoulders backing said liner.

3,989,422
DISPLACEMENT MACHINE FOR COMPRESSIBLE MEDIA

Heinrich Güttinger, Wettingen, Switzerland, assignor to Agin-for AG Fur Industrielle Forschung, Baden, Switzerland

Filed Jan. 29, 1976, Ser. No. 653,534
Claims priority, application Switzerland, Feb. 7, 1975, 1541/75
Int. Cl.² F04C 17/02
U.S. Cl. 418—55 10 Claims



1. A positive displacement machine for compressible media, comprising a displacement compartment bounded by an inner situated substantially spiral-shaped side wall and an outer situated substantially spiral-shaped side wall, said displacement compartment describing a span angle which exceeds 360° and extending between an inlet and an outlet, a displacement element arranged in the displacement compartment for carrying out a circulatory movement relative to the displacement compartment, said displacement element substantially possessing the shape of a spiral and having practically the same span angle as the displacement compartment, the displacement element during the course of the circulatory movement always contacting both the outer situated side wall and the inner situated side wall at least at one respective advancing contact line, the pole of a first section spanning thru about 360° of both the displacement compartment and the displacement element is offset from the pole of a second section which uniformly merges at the inner end of the first section, by an amount which is smaller than the mean radius of curvature at the inner end of said first section.

3,989,423

PISTON OF LIGHT METAL FOR A ROTARY PISTON COMBUSTION ENGINE

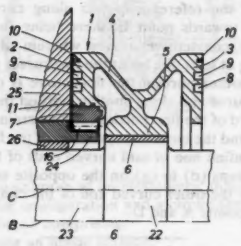
Max Rue, Obereisesheim; Horst Ehemann, Bad Friedrichshall II, and Konrad Lummerzheim, Neckargartach, all of Germany, assignors to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm and Wankel GmbH, Lindau, both of Germany

Filed July 2, 1975, Ser. No. 592,456

Claims priority, application Germany, July 4, 1974, 2432077

Int. Cl.² F01C *1/02, 21/00;* **F16H** *55/00*

U.S. Cl. 418—61 A **4 Claims**



1. A piston of light metal for a rotary piston combustion engine of trochoid type having a housing for accommodating the piston, the piston being rotatably mounted on the eccentric of an eccentric shaft and bearing a separate hollow gear of steel arranged coaxial with the axis of rotation of the piston, the gear being in engagement with a stationary pinion fixed to the housing and arranged coaxial with the axis of rotation of the eccentric shaft, the hollow gear being of a steel whose coefficient of expansion matches and is substantially equal to that of the piston material so that there is relatively no relative movement between the gear and piston due to different heat expansion during engine operation and the gear having teeth with an angle of mesh (αb) between 7° and 15° thereby reducing to tolerable limits, the backlash between the teeth of the gear and the engaged teeth of the pinion.

3,989,424

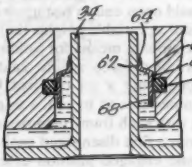
ENGINE PORTS

Alexander Goloff, East Peoria; Noble G. Barker, Pekin, and James A. Ritchie, Peoria Heights, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 31, 1975, Ser. No. 627,825

Int. Cl.² F01C *21/06;* **F04C** *29/04;* **F02F** *11/00;* **F01P** *3/14*

U.S. Cl. 418—83 **7 Claims**



1. A ported mechanism comprising:
a housing defining a chamber;
a piston movable within said chamber;
a port receiving opening in said housing;
a liner within said housing and defining chamber walls;
a port within said liner and including a tubular element received within, but spaced from, said opening;
a generally cylindrical element surrounding, in spaced relation, said tubular element and within said opening;
means defining a web sealingly engaging and extending from said tubular element to said cylindrical element for supporting said cylindrical element in said spaced relation such that a portion thereof is axially spaced from said web;
coolant passages between said housing and said liner and said opening, said web and said cylindrical element; and
a seal interposed between and sealingly engaging said portion of said cylindrical element and said housing at said opening;
whereby said seal prevents leakage at said port while said passages and said cylindrical element prevent rapid thermal deterioration of said seal.

3,989,425

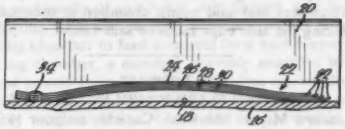
UNITIZED SEAL BIASING SPRING ASSEMBLY FOR ROTARY MECHANISMS

Donald F. Walker, Peoria; Roger O. Bjerk, Edelstein, and Harold C. Powers, Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed May 1, 1975, Ser. No. 573,693

Int. Cl.² F03C *3/00*

U.S. Cl. 418—122 **3 Claims**



1. In a rotary mechanism, the combination of:
means defining an operating chamber;
a rotor within said chamber;
at least one seal retaining groove in said rotor;
a seal retained in said groove and extending partially out of said groove into sealing engagement within said chamber; and
a unitized, multi-leaf spring assembly freely received in said groove and engaging said seal to bias the seal into said sealing engagement, said spring assembly comprising a plurality of curved, superposed, elongated leaf springs joined together at a corresonding point on the length thereof by a weld, said corresponding point being a low-stress point, at least one end of each spring being free for relative movement with respect to the corresponding end of each other spring.

3,989,426

VANE PUMP

Masayuki Sato, Hitachi; Fumio Fujisawa, Mito, and Kenichi Kawashima, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed July 18, 1975, Ser. No. 597,176

Claims priority, application Japan, July 24, 1974, 49-84205

Int. Cl.² F04C *29/10*

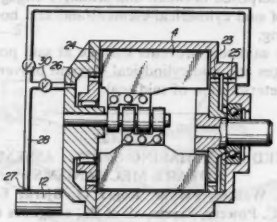
U.S. Cl. 418—138 **10 Claims**

1. A vane pump comprising:
a housing defining a cylindrical pump chamber having closed ends;
a vane shaft supported at one of said closed ends and extending in said pump chamber in alignment with the center axis thereof;
a plurality of vanes rotatably supported by said vane shaft;
a drive rotor including a cylindrical portion, end walls disposed at opposite ends of the cylindrical portion, and a rotor shaft for supporting said drive rotor for rotation in said pump chamber, said cylindrical portion having axial slits through which said vanes extend, and said cylindrical portion being arranged eccentrically in said pump chamber;

a suction port and a discharge port, both of which are communicated with said pump chamber;

side chambers formed respectively between the end walls of said drive rotor and said closed ends of said housing;

conduit means for conducting fluid from said discharge port to the respective side chambers;



valve means installed in said conduit means for controlling flow of said fluid to said respective side chambers; and

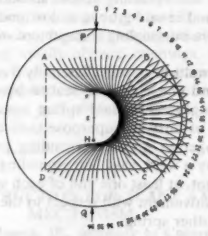
means formed through said end walls of said drive rotor for communicating said fluid between said respective side chambers and said pump chamber in locations always facing the side edge faces of said vanes.

3,989,427

ROTARY FLUID HANDLING DEVICE

C. Leonard Meyer, Montreal, Canada, assignor to The Raymond Lee Organization, Inc., a part interest

Filed June 21, 1974, Ser. No. 481,654
Int. Cl.² F01C *21/00*
U.S. Cl. 418—150 **11 Claims**



1. A rotary fluid handling device comprising a main chamber derived from a square and a rotating element with grooved end plates within the chamber which includes vanes of specific curvature and length and cooperating therewith to define working chambers within the chamber, the walls defining the chamber, when viewed in cross-section in the axial direction, comprising a pair of parallel sides derived from the sides of a square and a pair of inwardly concave curved ends interconnecting said straight sides, said curved ends having a shape defined as follows:

a. starting with a square wherein A, B, C and D represent the four corners thereof with one straight side of the chamber lying along AB and the other said straight side of the chamber lying along CD, draw a reference line through the center E of the square intersecting line AB at right angles thereto,

b. from a point F on the reference line midway between E and line AB draw lines to corner A and to corner B and find the point which is at the center of a circular arc which includes thereon points A, F, and B,

c. with point E as a center and the distance between E and P as a radius, define a circle about the square,

d. mark off a plurality of equally spaced points about half of the circle starting from point P and ending at point Q which is diametrically opposed to point P which half circle encompasses side BC of the square,

e. with each of the said center points as a center, describe a circular arc intersecting the square at two points, wherein all arcs other than those from center points P and Q intersect either line AB or CD as one of said points and then BC as the other of said points.

f. on each of said arcs, mark off a straight line distance equal to a side of the square from the point where that arc intersects either line AB or CD and ending at a reference point on that arc beyond the side BC,

g. connect the reference points along curves which are concave towards point E, there being first and second generally coextensive curves wherein along a portion including at least one point the two curves are coincident, along another portion the first curve is outward of the second curve and along another portion the second curve is outward of the first portion, and wherein the coincident portion and the outermost portions of the first and second curves define one of said curved ends of the chamber,

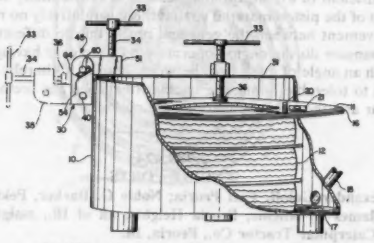
h. repeat steps (d) to (g) on the opposite sides of line PQ to define the other curved end of the chamber interconnecting points A and D.

3,989,428

QUICK RELEASE ADJUSTABLE CLAMP FOR RETAINING INSERT IN CYLINDRICAL CONTAINER

Sidney R. Cox, Tallapoosa, Ga., assignor to Associated Rubber Company, Tallapoosa, Ga.

Filed May 5, 1976, Ser. No. 683,388
Int. Cl.² B29H *5/04*
U.S. Cl. 425—18 **4 Claims**



1. Container means comprising in combination, a substantially cylindrical container having an open end for receiving contents disposed at variable heights therein, a removable insert fitting inside said open end to rest upon said contents of the container disposed at variable heights therein, and adjustable quick release clamping means for holding said insert in place with predetermined force against said contents, said clamping means comprising a set of pivot frame members affixed to said container around its rim, a single pivoting arm member registering with each frame member at a pivot axis to pivot thereabout from a first disengaged position outside said open end to a second engaged position extending over said open end, an adjustable clamp positioned in said pivoting member to extend over said insert in the second position to bear into forcible contact with said insert with a force determined by the adjustment of said clamp, and quick release locking means for holding the pivoting member in said second position constituting a manually removable pin registering snugly through an aperture through both said pivot frame and said pivoting member and having a manually operable structure thereon to facilitate entry and removal from said apertures thereby serving as a quickly removable retainer for holding said pivoting member in said second position.

3,989,429

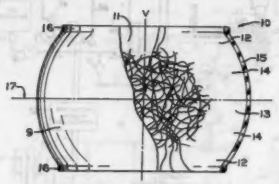
REINFORCED MEMBRANE

William Frank Mattson, Hinckley, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 595,880, July 14, 1975. This application Apr. 2, 1976, Ser. No. 672,964

Int. Cl.² B29H 5/18

U.S. Cl. 425—52 10 Claims



1. A curing membrane of an elastomeric material having a generally annular configuration and a circumferential centerline, said membrane comprising:

a. a wall having an inside surface;

b. a plurality of interconnected ribs integrally molded to said inside surface; and

c. a plurality of adjacent polygons defined by said interconnected ribs, the improvement wherein at least a portion of one of said interconnected ribs is disposed at an oblique angle to the plane of said circumferential centerline.

3,989,430

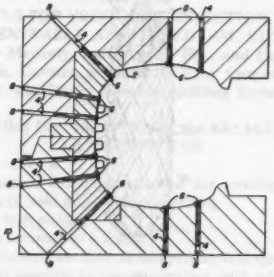
TIRE MOLD HAVING NAILS INSERTED IN THE VENTS

Charles R. Dailey, Cuyahoga Falls, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Filed Feb. 12, 1976, Ser. No. 657,416

Int. Cl.² B29H 5/02

U.S. Cl. 425—28 R 6 Claims



1. A tire mold for imparting a tread design into the surface of a tire while the tire is being cured, said tire mold having vents for the purpose of releasing air which would otherwise be trapped as the uncured rubber is forced into the tread design section of the mold, the improvement which comprises a nail having a head and a shank inserted within at least some of the mold vents, the head of each nail being inside the mold cavity and the shank of the nail extending into the vent, and each nail being secured into place so that each shank is movable along the length of the vent from zero to 0.125 mm.

3,989,431

PILE EXTRUDER

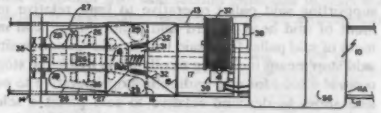
Ernst Martens, Winnipeg, Canada, assignor to Spirill Corporation Ltd., Winnipeg, Canada

Filed Feb. 10, 1975, Ser. No. 548,272

Claims priority, application United Kingdom, Feb. 11, 1974, 6099/74

Int. Cl.² B28B 3/22

U.S. Cl. 425—112 21 Claims



1. A pile extruding machine which is adapted to be mounted for movement along a pair of rails having a pallet therebetween, a plurality of longitudinally extending reinforcing wires supported above said pallet for incorporation into the pile formed by said machine, a source of power and a source of reinforcing wire mounted on said machine; said machine comprising in combination supporting framework, a feed hopper supported by said framework, a packing chamber extending rearwardly of and below said hopper, said hopper communicating with said packing chamber, means adjacent said packing chamber to feed concrete from said hopper into said packing chamber, a mandrel assembly mounted by one end thereof to said framework and extending rearwardly under the base of said hopper and through said packing chamber substantially concentrically therewith, non rotatable coil guide means extending forwardly of the base of said hopper and concentric with said mandrel assembly, a coil forming assembly mounted on said framework and connected to said source of power to form individual lengths of coils of reinforcing wire in a rotatable manner around said coil guide means said individual length of coils being interlocked one with the other by adjacent ends thereof.

3,989,432

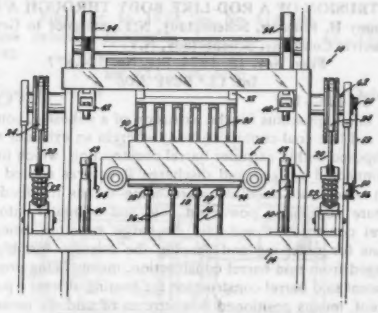
MEANS FOR SLUMPING CEMENT BLOCKS

Charles W. Depka, Carlsbad, Calif., assignor to Modern Builders Supply Co., Oceanside, Calif.

Filed Feb. 18, 1975, Ser. No. 550,466

Int. Cl.² B28B 3/08, 13/05

U.S. Cl. 425—139 2 Claims



1. In a machine making cement blocks having a mold with cores vertically aligned to receive a cementitious mixture to form a block shape in said cores, a stripper head located above said mold and having shoes adapted to move downardly through said cores to extrude said block shape from said cores, a pallet to receive said block shape, means supporting said pallet below said mold and means connected to said

supporting means and operative therewith so as to cause said pallet to be moved from a first upper position substantially abutting the bottom of said mold such a distance as to support the lower surface of said block shape as it is extruded from said mold to a second lower position, said stripper head being free to move downwardly under force of gravity as said shoes extrude said block shape from said mold onto said descending pallet, am improvement in said machine to produce a slump block, comprising:

a. stop means between said stripper head and said means supporting said pallet operative to limit relative movement of said head toward said pallet during said movement of said pallet from said first to said second position,

b. said stop means including a collapsible hydraulic stop and control means for said hydraulic stop operative to permit said shoes to descend relative to said pallet a selected limited distance as said shoes extrude said block shape from said mold whereby said shoes apply pressure to slump said block shape,

c. a pressurized hydraulic accumulator and a line connecting said accumulator to said hydraulic stop thereby providing substantially constant hydraulic pressure to said hydraulic stop and said control means for said stop including flow control means interposed in said line so that the rate of collapse of said hydraulic stop is controlled by said flow control means as to the rate of flow through said line and the distance of said collapse is a function of the time available between the start of collapse and the end of the cycle of extruding said block shape and of the rate of flow permitted by said flow control means,

d. said flow control means including a flow control valve and a manual control for said flow control valve that can be adjusted by an operator to control the rate of flow through said line during a block making run of said machine thereby to adjust slumping action according to changing conditions and observations of slumping results and

e. an on-off valve assembly interposed in said line and on-off valve control means operatively connecting said pallet supporting means and said on-off valve assembly and activated by movement of said pallet supporting means, said on-off valve control means controlling the start of collapse of said hydraulic stop by when said on-off valve assembly is opened by said on-off valve control means.

3,989,433

APPARATUS FOR CONTROLLING RESISTANCE TO EXTRUSION OF A ROD-LIKE BODY THROUGH A DIE

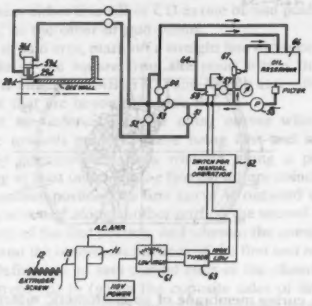
Anthony H. Furman, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 18, 1974, Ser. No. 524,577
Int. Cl.[2] B29F *3/06*
U.S. Cl. 425—149 **14 Claims**

1. In an apparatus for the extrusion of a cohesive, continuous, rod-like coal-containing body wherein an extruder screw is disposed within extruder barrel construction, which in turn is connected to feed and discharge structures spaced from each other, said feed structure being means for feeding a mixture containing powdered coal and a binder into said barrel construction and said discharge structure being die means for receiving and shaping the mixture forcibly discharged from said barrel construction, means being provided adjacent said barrel construction for heating at least a portion thereof, means positioned downstream of said die means for severing the emerging rod-like body into smaller portions and means connected to said screw for driving said screw, the improvement comprising:

a. said die means being open-ended and of substantially constant cylindrical configuration internally, the wall of said die means having a plurality of spaced apart movable portions thereof adapted for inward displacement to selectively change the degree of discontinuity of the inner surface of said wall for contact with the mixture in transit therethrough, and

b. means engaging each of said movable wall portions for controllably varying the force with which said movable



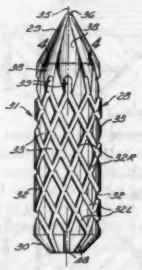
wall portions may be displaced inwardly, said force varying means including means for the automatic actuation thereof as a function of the force exerted by the means for driving the extruder screw.

3,989,434

BLENDING AND MOLDING MEANS

James R. Mercer, Akron, Ohio, assignor to McDowell-Wellman Engineering Company, Cleveland, Ohio

Filed Oct. 29, 1975, Ser. No. 626,841
Int. Cl.[2] B29F *3/02;* **B01F** *5/06*
U.S. Cl. 425—207 **11 Claims**



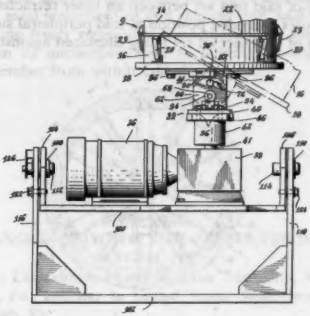
1. A device for mixing flowable material comprising an inlet zone, a plurality of separate inlet passages in said inlet zone adapted to receive material from a single chamber, an outlet zone, a plurality of separate outlet passages at said outlet zone adapted to distribute material into a common chamber, means defining a plurality of flow paths between said inlet and outlet passages, each of said flow paths along its length being alternately isolated from adjacent flow paths and then intersecting with an adjacent flow path, said paths intersecting along lines that are bilaterally asymmetrical to a net flow direction between said inlet and outlet zones.

3,989,435

APPARATUS FOR FABRICATING SPHERICALLY SHAPED PARTICLES OF SMALL DIAMETER

Frederick M. Allen, Walworth, and Anthony F. Lipani, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 15, 1974, Ser. No. 524,014
Int. Cl.² B29B *1/03*
U.S. Cl. 425—222 **8 Claims**



1. A pelletizing apparatus comprising:

a body having a surface thereof for receiving finely divided material which is to be pelletized by movement of said material across said surface under the influence of gravitational forces as said body is transported, said body having a longitudinal axis thereof, and,

means for transporting said body for causing an axial location on said body to traverse a circular course which extends in a plane, said plane forming an acute angle with the horizontal and for simultaneously rotating said body about said axis in said plane during transport, and for causing the movement of said longitudinal axis to define a conical surface of revolution, a longitudinal axis of said conical surface of revolution forming an acute angle with the horizontal.

3,989,436

APPARATUS FOR PRODUCING INJECTION MOLDED AND CENTRALLY APERTURED DISC RECORDS

Michael Lee McNeely, Indianapolis, Ind., and Herbert Rees, Willowdale, Canada, assignors to RCA Corporation, New York, N.Y. and Husky Injection Molding Systems, Bolton, Canada

Filed Dec. 18, 1975, Ser. No. 642,162
Int. Cl.² B29F *1/00*
U.S. Cl. 425—242 R **11 Claims**

1. An injection molding apparatus for molding centrally apertured parts, said apparatus comprising:

A. an injection nozzle;

B. a platen secured to a frame;

C. a sprue bushing secured to said platen; said sprue bushing having an opening in communication with said injection nozzle;

D. a first mold-half;

E. bearing means for supporting reciprocal motion of said first mold half relative to said platen;

F. a second mold-half;

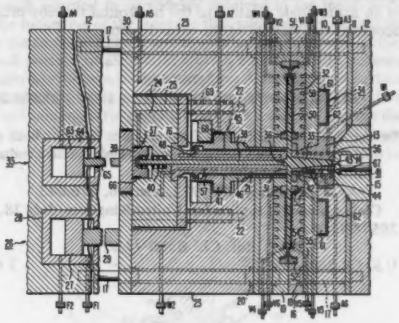
G. bearing means for supporting reciprocal motion of said second mold-half relative to said platen;

H. a punch;

I. bearing means for supporting reciprocal motion of said punch relative to said second mold-half;

J. selectively actuated means for causing motion of said second mold-half between a closed location and an open location; said punch having an end portion in registry with said sprue bushing; said punch end portion defining with said opening in said sprue bushing a sprue passage, and said first and second mold halves defining an annular cavity surrounding said sprue passage, when said second half-mold is in said closed location; and said annular cavity and said sprue passage forming, respectively, said centrally apertured part and a sprue when heated material is injected therein;

K. selectively actuated means for causing motion of said first mold-half with said second mold-half in response to motion of said second mold-half from said closed location



to a location which is intermediate of said closed location and said open location whereby said annular cavity remains closed while said first and second mold halves move from said closed location to said intermediate location; and

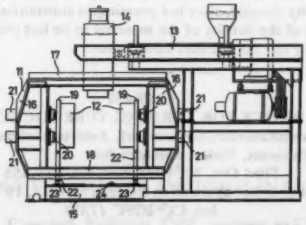
L. selectively actuated means for locking said punch in place while said first and second mold halves move from said closed location to said intermediate location whereby said sprue is severed from said part along the peripheral surface of said punch end portion; and a portion of said first mold-half where said punch end portion enters serving as a die.

3,989,437

MOULDING APPARATUS

Erich Kiefer, Bonn-Holzlar; Heinz Rolniczak, Hennef, and Peter Bohlscheid, St. Augustin, all of Germany, assignors to Kautex-Werke Reinold Hagen GmbH, Bonn-Holzlar, Germany

Filed Oct. 11, 1974, Ser. No. 514,208
Claims priority, application Germany, May 15, 1974, 2423503
Int. Cl.² B29C *5/06*
U.S. Cl. 425—326 B **11 Claims**



1. Apparatus for the production of hollow articles of thermoplastics material by a blowing process, comprising a hollow mould in which a preform blank is arranged to be expanded by the application of blowing pressure, the mould being

formed in at least two parts with the mould parts each comprising a supporting carrier body being movable relative to one another, means for effecting relative horizontal movement of the mould parts, and means positioned outside the path of movement of said mould parts and supporting carrier body for taking up the forces resulting from the blowing pressure, comprising a closed frame having stationary side pieces on which the mould parts are supported for movement and which comprises upper and lower tie members extending between said side pieces, the upper and lower tie members being arranged to lie in respective vertical planes which are spaced from one another, and the side pieces being oriented at an acute angle relative to the horizontal thereby providing access to the vicinity of the mould parts.

3,989,438

METHOD FOR PRODUCING A HOT PRESSED COMPONENT

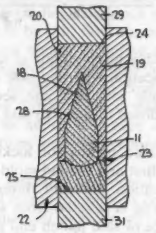
Dexter William Smith, and Roland John Lumby, both of Birmingham, England, assignors to Joseph Lucas (Industries) Limited, Birmingham, England

Filed July 28, 1972, Ser. No. 276,043

Claims priority, application United Kingdom, July 28, 1971, 35578/71

Int. Cl.² B30B *11/02*

U.S. Cl. 264—332 **7 Claims**



1. A method of producing a hot pressed component comprising the steps of: positioning material to be hot pressed in a die cavity defined between a pair of die parts, at least one of the die parts being substantially compressible during hot pressing of said material and being of substantially uniform density, and applying pressure to the die parts at an elevated temperature so as to compress said one die part and (simultaneously hot press) so as to cause pressure to be transmitted by the die parts to said material so that the material is simultaneously hot pressed by the die parts into said components, the material of said one die part different from the material to be hot pressed, and the density of said one die part remaining substantially uniform after hot pressing and being arranged so that the ratio of the density thereof, prior to hot pressing, to the density thereof, after hot pressing, is substantially equal to the ratio of the density of the material to be hot pressed to the density of the hot pressed component.

3,989,439

DEVICE FOR FORMING TUBE SOCKETS

Franz Schmitzberger, Getzersdorf, Austria, assignor to Inteco Establishment, Vaduz, Liechtenstein

Filed Oct. 30, 1974, Ser. No. 519,255

Claims priority, application Austria, Nov. 23, 1973, 9847/73

Int. Cl.² B29C *17/00*

U.S. Cl. 425—392 **10 Claims**

1. A device for forming sockets with annular corrugations or recesses on tubes of plastic material comprising a core having a longitudinal axis and a peripheral surface over which a tube to be formed is fitted, a plurality of segments circumferentially arranged around the core at said surface and including a first set wherein the segments end oppositely in outwardly converging wedge surfaces and a second set wherein the segments end oppositely in outwardly diverging wedge surfaces, the segments of said first and second sets being alternately arranged with adjacent wedge surfaces of the same inclination and in sliding contact, spring means acting on the segments of said second set biasing said adjacent wedge surfaces into contact, means mounting each of said segments for slidable displacement substantially radially of the core in a plane perpendicular to the core axis, fluid motor means driving the segments of said first set between an inner retracted position and an outer extended position at said peripheral surface, the segments of said second set being displaced against the force

of said spring means by outward movement of the segments of said first set to an outer extended position in circumferentially continuous relation with the extended segments of said first set, said spring means being energized by outward movement of said second set of segments, rim means at said peripheral surface for uniformly limiting outward movement of said segments, and said segments being shaped at their outer faces to define in said outwardly extended limited positions a substantially continuous annular bead at said surface adapted to form the corrugation or recess in said tube, said first set of segments being driven inwardly to retracted position by said motor means, and said energized spring means driving said second set of segments to inner retracted position as the first set of segments is retracted.

3,989,440

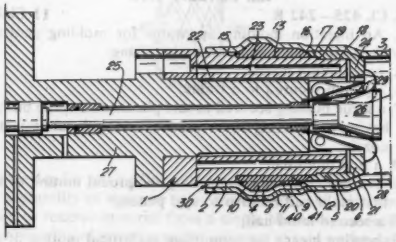
DEVICE FOR SHAPING A BELL END TO A TUBE

Petrus Marinus Acda, Oosterhaven, Enkhuized, Netherlands, assignor to Polva-Nederland N.V., Enkhuizen, Netherlands

Division of Ser. No. 100,296, Dec. 21, 1970, Pat. No. 3,853,450. This application Nov. 29, 1974, Ser. No. 528,117

Int. Cl.² B29C *17/02*

U.S. Cl. 425—393 **4 Claims**



1. A mandrel for shaping a bell end of a tube of a thermoplastic material, said mandrel comprising a central cylindrical member having a hardness greater than that of said thermoplastic material, and a shaping ring slidably mounted on said central member, said shaping ring having an outer diameter greater than the outer diameter of said central member, and

being of a material having a hardness between the hardness of said thermoplastic material at ambient temperature and the hardness of said thermoplastic material at the deforming temperature thereof, cooperating means on said ring and said central member inhibiting movement of said shaping ring away from the end of said mandrel beyond a predetermined location on said central member, cooperating means on said ring and said central member for inhibiting radial expansion of said shaping ring, and releasable clamping means abutting the end of said shaping ring toward the end of said mandrel for inhibiting axial movement of said shaping ring, said clamping means being freely removable from the end of said central member in its unclamped state to permit removal of said central member from within said shaping ring.

3,989,441

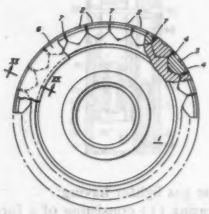
EXPANSION SHIM FOR HOT BRIQUETTE ROLL SEGMENTS

William L. Lauterbach, Upper St. Clair Township, Allegheny County, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 409,833, Oct. 26, 1973, Pat. No. 3,938,930. This application Aug. 6, 1975, Ser. No. 602,151

Int. Cl.² B29C *1/00, 15/00*

U.S. Cl. 425—471 **2 Claims**



1. A hot briquette roll comprising a roll core, mold segments on the circumference thereof, said mold segments spaced to provide expansion gaps, and shims of a low melting alloy in the expansion gaps.

3,989,442

APPARATUS FOR BLOW MOLDING THERMOPLASTIC MATERIAL

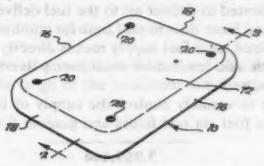
Raymond C. Confer, Gasport, N.Y., and Floyd H. Talmon, Fairview Park, Ohio, assignors to Air-Lock Plastics, Inc., Tonawanda, N.Y.

Division of Ser. No. 21,944, March 23, 1970, Pat. No. 3,742,995. This application June 5, 1973, Ser. No. 367,111

Int. Cl.² B29D *3/00, 23/03*

U.S. Cl. 425—503 **4 Claims**

1. A blow molding apparatus for forming a hollow article having at least one insert permanently affixed thereto comprising: mold sections which when engaged form a mold cavity, an insert having an apertured surface within the cavity, means extending through an aperture in the wall of at least one of said mold sections for releasably mounting said insert with the apertured surface in spaced relation to an adjacent cavity wall with a minimum sliding clearance being provided between said means and said mold wall aperture, said insert mounting means comprising a pin of lesser diameter than said apertured surface and having an end face projecting slightly inwardly of the wall of said mold cavity and an extension portion having a diameter less than the diameter of said pin and being adapted to be slidably received in the insert aperture for mounting of the insert so that said end face of said pin abuts the surface of the insert to overlap the aperture therein, the wall portion of said mold section encircling and defining said aperture therein having a uniform, uninterrupted surface with respect to the remainder of the adjacent mold section wall, and said mounting means being releasable away from the insert in a slidable manner upon undergoing relative linear movement with respect to the insert in a direction toward the



adjacent cavity wall, means associated with said mold sections for forming a hollow parison of thermoplastic material, means operatively connected to said mold sections for closing said mold sections about said parison to enclose a portion thereof, one of said mold sections having fluid conducting means, and means associated with said conducting means for introducing fluid through said fluid conducting means into said enclosed parison portion to expand the same into conformity with said cavity and about said insert with some of the material flowing around said pin between a portion of the apertured surface of the insert and the adjacent cavity wall, thereby partially encapsulating said insert with substantially none of the material flowing into or through the surface of said mold section wall encircling said pin and aperture defined therein.

2. A blow molding apparatus as set forth in claim 1 wherein said insert has a flange which has at least one opening therein so that thermoplastic material may flow into the opening and partially about the outer side of said flange to interlock the same with the molded article.

3,989,443

MULTIPLE FUEL BURNER AND USAGE IN ROTARY KILNS

William C. Campbell, Redlands, Calif., assignor to California Portland Cement Company, Los Angeles, Calif.

Filed Oct. 10, 1975, Ser. No. 621,463

Int. Cl.² F23C *1/00*

U.S. Cl. 431—8 **18 Claims**

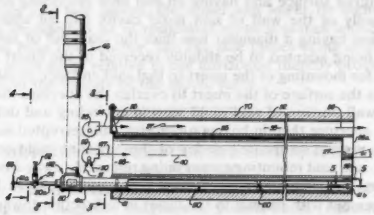
1. In a multiple fuel burner assembly

a. a forwardly elongated inner duct to deliver pulverized

solid fuel to a burning zone beyond the end of the duct,

b. multiple pipes including liquid fuel pipes and gaseous fuel pipes spaced about the inner duct and opening generally forwardly to deliver fluid fuel to said zone beyond the ends of said pipes,

c. air delivery structure located outwardly of said inner duct



and oriented to deliver air to the fuel delivered from said pipes and inner duct to said zone for combusting said fuel,

d. pulverized solid fuel supply means directly communicating with said inner duct to deliver pulverized solid fuel thereto, and

e. means to variably control the supply of liquid fuel and gaseous fuel via said liquid and gaseous fuel pipes.

3,989,444

GAS BURNER AND PROCESS FOR THE PARTIAL COMBUSTION OF A GASEOUS FUEL

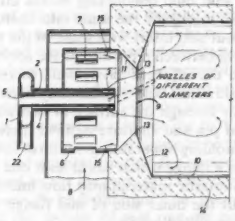
Gernot Staudinger, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Dec. 9, 1974, Ser. No. 530,645

Claims priority, application Netherlands, Dec. 20, 1973, 7317443

Int. Cl.² F23D *15/00*

U.S. Cl. 431—181 **5 Claims**



1. A gas burner comprising a burner gun, an air chamber around the gun, and a combustion chamber, which air chamber debouches into the combustion chamber via an annular combustion mouth, the burner gun having a cylindrical barrel for the supply of gaseous fuel to the combustion chamber through the said combustion mouth, the annular combustion mouth formed by a convergent inner wall and divergent inner wall located on either side of a restriction situated outside the front-end of the barrel of the burner gun, in which two groups of radial outflow nozzles of different diameters are provided, near the combustion mouth, in the side wall of the burner gun near the closed front-end of the barrel, which nozzles serve to dose gaseous fuel into the oxygen or oxygen-containing gas flowing through the combustion mouth, the nozzles being substantially regularly distributed around the barrel, the axes of the nozzles being in a common plane and being perpendicular to the axis of the barrel, the ratio of the diameter of the outflow nozzles and the diameter of the restriction being between 0.030 and 0.060, with one group of at least 6 outflow nozzles with a diameter smaller than the other group of at least 6 outflow nozzles of larger diameter, the ratio between the diameter of the restriction, and the distance from a plane through the outflow nozzles to a plane through the restriction being between 1.5 and 1.7.

3,989,445

PENCIL TYPE GAS LIGHTER

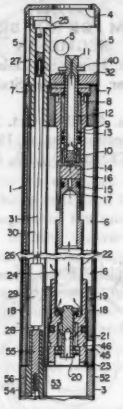
Mitsuo Kojima, Ichikawa, Japan, assignor to Kojima Precision Parts Co., Ltd., Japan

Filed July 21, 1975, Ser. No. 597,328

Claims priority, application Japan, Aug. 19, 1974, 49-94242; Feb. 22, 1975, 50-24479; Feb. 22, 1975, 50-24478; Mar. 22, 1975, 50-38663; Mar. 22, 1975, 50-38664; Mar. 23, 1975, 50-38554; Mar. 23, 1975, 50-38555

Int. Cl.² F23Q *2/28*

U.S. Cl. 431—256 **15 Claims**



1. In a pencil type gas lighter having:

a. a cylindrical casing (1) consisting of a fore cylinder (2) provided with a flame port (4) at the front end and a rear cylinder (3) separately joined with said fore cylinder;

b. a gas container (6) in said fore cylinder housing, an ignition nozzle with a gas valve (10) disposed on the fore cylinder front end side of said gas container in communication with said gas container through said gas valve (19);

c. a discharge electrode (25) positioned within the range of gas ejection from the ignition nozzle, and a feed valve disposed on the fore cylinder rear end side of said gas container for supplying gas into said gas container; with,

d. a high voltage generating means (47) in said rear cylinder, electrically connected to said discharge electrode (25), said high voltage generating means having a valve opening member (32) and a lever, said valve opening member (32) being adapted for opening the gas valve in cooperation with the lever operable to generate a high voltage in said high voltage generating means; the improvement therein, wherein the ignition nozzle is provided at the front end of a hollow valve shaft the rear end of which is connected to the gas valve provided in the gas container, and a coupling is provided at the rear end of the gas container, said gas container being slidably fitted into said fore cylinder, said coupling of the gas container being separably joined to the counterpart provided in the inside of the joining end of the rear cylinder, said fore cylinder being provided at its rear end with said lever adapted to act on the high voltage generating means during sliding movement of said fore cylinder to generate

a high voltage and also provided to move the ignition nozzle to the open position of the gas valve when said fore cylinder slides forwards.

3,989,446

METHOD AND KILN FOR CALCINING FINELY DIVIDED MATERIAL

Michael Grill, Leoben, and Helmut Grohmann, St. Jakob near Mixnitz, both of Austria, assignors to Veitscher Magnesitwerke-Aktiengesellschaft, Vienna, Austria

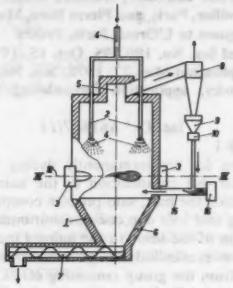
Filed Mar. 19, 1975, Ser. No. 559,811

Claims priority, application Austria, Mar. 25, 1974, 2436/74

Int. Cl.² F27B *15/00*

U.S. Cl. 432—14 **16 Claims**

1. In a method of heat treating finely divided material, wherein the material is introduced into a treatment chamber at a first inlet zone and is subjected to a treatment temperature in the treatment chamber, a stream of hot gas is passed into and through the chamber to produce said temperature, completely heat treated material is removed from the chamber through one outlet, the hot gas stream carries along some of the material not completely heat treated, the gas stream with the incompletely heat treated material is removed from the chamber through another outlet, the incompletely heat treated material carried by the hot gas stream is separated therefrom after removal from the chamber, and returning the separated material to the treatment chamber at a second inlet zone spaced from the first inlet zone: the step of returning the



separated material through a confined zone heated to a temperature in the range of the treatment temperature.

3,989,447

PROCESS FOR NONPERMANENTLY DYEING HUMAN HAIR WITH INDAMINE INDOANILINE AND INDOPHENOL HAIR DYES

Gregoire Kalopissis, Paris; Andrée Bugaut, Boulogne-sur-Seine; Francoise Estradier; Giuliana Ghilardi, Paris; Jean-Francois Grollier, Paris, and Pierre Bore, Montfermeil, all of France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 189,795, Oct. 15, 1971, abandoned. This application May 27, 1975, Ser. No. 580,787

Claims priority, application Luxembourg, Oct. 19, 1970, 61889

Int. Cl.² A61K *7/13*

U.S. Cl. 8—10.1 **13 Claims**

1. A process for nonpermanently dyeing human hair by applying a hair dye composition to the hair in an amount effective to color the hair, said process comprising

1. preparing said hair dye composition immediately before application of the same to the hair by incorporating into an aqueous carrier a dye in powder form, said dye being selected from the group consisting of

a. a compound having the formula

$$Y - Ar_1 - N = Ar_2 = X$$

wherein Ar_1 and Ar_2 each independently are selected from the group consisting of phenyl and pyridyl, each optionally substituted with a member selected from the group consisting of amino, hydroxy, lower alkoxy, lower alkyl, acetylamino and halogen, Y represents a member selected from the group consisting of hydroxy and

wherein R_1 and R_2 each independently represents a member selected from the group consisting of hydrogen, lower alkyl and amino lower alkyl wherein the amino moiety is optionally substituted by a member selected from the group consisting of acetyl, carbamyl and mesyl and X represents a member selected from the group consisting of oxygen, imine and iminium group, and

b. a salt of the compound defined in (a), said composition containing 0.0005–2 percent by weight of said dye, and

2. applying the thus prepared hair dye composition to the hair in an amount effective to color the hair.

3,989,448

OVERPRINT OF SOLVENT ON TOTAL SOLVENT COATING

Walter J. Bohrn, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Apr. 12, 1974, Ser. No. 460,388

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl. D44d *1/02*

U.S. Cl. 8—14 **3 Claims**

1. The method of forming an embossed pattern effect on pile fabric material which consists of the steps of:

a. first providing a carpet material with a backing and a pile upper face surface, the pile face surface containing fibers which may be shrunk by a selected solvent while the backing material will be unaffected by the solvent solution,

b. applying a first solvent solution to the total fiber face surface of the carpet to saturate the full length of the fibers with solvent solution, said solvent solution applied being of a concentration that can cause shrinkage of the pile face surface fibers,

c. subsequently applying to only selected areas of the fiber face in a desired pattern a second solution which will dilute the total originally applied solvent-containing solution in the pattern areas to the point that the solvent now in the total solution will have little or no effect upon the fibers of the pile surface to shrink the fibers, and

d. thereafter subjecting the pile fabric to heat to cause the yarns in the fiber face surface which have been only wetted by the first solvent-containing solution to shrink and present a desired embossed pattern appearance since in those areas where there has been the printing of the second solution, the solvent concentration has been diluted to the point that the solvent has very little or no shrinkage effect upon the fibers of the pile surface and, therefore, a two-level pile surface results.

3,989,449

DYESTUFF COMPOSITIONS

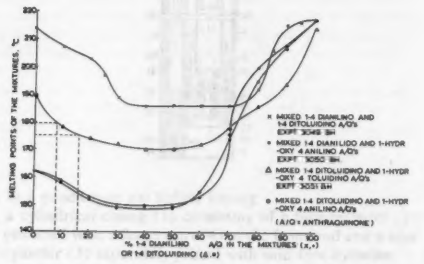
Leonard Fox Dixon, Elland; Bryan Ronald Hinchcliffe, Scholes near Holmfirth, and Cyril Eric Vellins, Gatley, all of England, assignors to L. B. Holliday & Co. Limited, Huddersfield, England

Continuation-in-part of Ser. No. 14,634, Feb. 26, 1970, abandoned. This application Jan. 19, 1973, Ser. No. 324,978

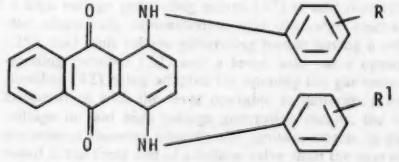
Claims priority, application United Kingdom, Mar. 4, 1969, 11376/69; Sept. 8, 1969, 44231/69

Int. Cl.² D06P *3/00*

U.S. Cl. 8—25 **24 Claims**


MELTING POINTS OF THE MIXTURES, °C
% 1-4 DIANILINO A/O IN THE MIXTURES (x,•)
OR 1-4 DITOLUIDINO (Δ, ▲)
× MIXED 1-4 DIANILINO AND 1-4 DITOLUIDINO A/O's EXPT 3048 BH
• MIXED 1-4 DIANILIDO AND 1-HYDR -OXY 4 ANILINO A/O's EXPT 3050 BH
Δ MIXED 1-4 DITOLUIDINO AND 1-HYDR -OXY 4 TOLUIDINO A/O's EXPT 3051 BH
▲ MIXED 1-4 DITOLUIDINO AND 1-HYDR -OXY 4 ANILINO A/O's
(A/O = ANTHRAQUINONE)

1. A dyestuff composition comprising in combination at least two dyestuffs having the general formula:



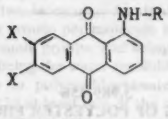
in which R and R^1 are each selected from the groups consisting of hydrogen, lower aklyl, lower alkoxy, acyl, acyloxy and halogen radicals, the two dyestuffs interacting to provide an improved combined effect on the dyeing properties of the dyestuff.

3,989,450
NITROANTHRAQUINONES

Walter Hohmann, Leverkusen; Helmut Herzog, Bergisch-Neukirchen, and Hans-Samuel Bien, Burscheid, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 8, 1974, Ser. No. 431,710
Claims priority, application Germany, Jan. 8, 1973, 2300591; Jan. 30, 1973, 2304320
Int. Cl.² C09B 1/00; D06P 1/20
U.S. Cl. 8—39 R **14 Claims**

1. Process for dyeing and printing synthetic fibre materials, characterised in that compounds of the formula

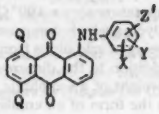


in which

R represents an optionally substituted phenyl radical, one X represents a nitro group and the other X represents hydrogen

or their mixtures are used.

3. Process for dyeing and printing synthetic fiber materials in which dyestuffs of the formula



wherein

Z′ denotes hydroxyl, alkoxy, alkylmercapto, phenoxy, benzyloxy, cyclohexyl, phenyl, alkylsulphonyl, alkylsulphonyloxy, alkylcarbonyloxy, phenylcarbonyloxy, alkoxycarbonyloxy, alkylcarbonyl, phenylcarbonyl, alkylcarbonylamino, alkoxycarbonylamino, alkylaminocarbonylamino, phenoxysulphonyl, alkylsulphonylamino and dialkylaminosulphonyl;

X and Y denote hydrogen, fluorine, chlorine, bromine, alkyl, alkoxy or alkylcarbonylamino;

one Q denotes a nitro group and

the other Q denotes a hydrogen atom;

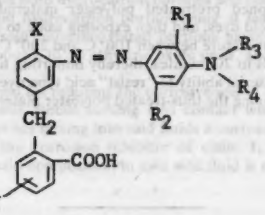
and the above-mentioned alkyl and alkoxy groups have 1–5 C atoms and are unsubstituted or substituted by CN, OH, C_1–C_4-alkoxy or halogen; and the phenyl, benzyl and phenoxy radicals mentioned are unsubstituted or substituted by halogen or C_1–C_4-alkyl; are used.

3,989,451
THERMOFIX PROCESS FOR THE DYEING OF POLYESTER FIBERS

Edgar Earl Renfrew, and Dominic Andrew Zanella, both of Lock Haven, Pa., assignors to American Color & Chemical Corporation, Charlotte, N.C.

Division of Ser. No. 241,810, April 6, 1972, Pat. No. 3,884,901. This application Feb. 15, 1974, Ser. No. 442,827
Int. Cl.² D06P 1/39
U.S. Cl. 8—41 C **5 Claims**

1. Polyester dyed with a compound of the formula



wherein

R_1 is hydrogen or lower alkoxy;

R_2 is hydrogen, lower alkoxy or R_7CONH—;

R_3 is lower alkyl, hydroxy(lower alkyl), cyano(lower alkyl) or $—CH_2CH_2OCOR_7$;

R_4 is lower alkyl, hydroxy(lower alkyl), cyano(lower alkyl), or $CH_2CH_2OCOR_7$;

R_7 is independently lower alkyl, bromo(lower alkyl), cyano(lower alkyl), phenyl, or chlorophenyl;

X is hydrogen, chlorine, lower alkoxy, or lower alkoxy (lower alkoxy); and

Y is hydrogen or bromine.

3,989,452
STABLE, CONCENTRATED SOLUTIONS OF COMPLEX METAL COMPOUNDS OF AZO DYESTUFFS

Paul Hugelshofer, Muttenz, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 298,171, Oct. 16, 1972, which is a continuation of Ser. No. 54,610, July 13, 1970, abandoned. This application Feb. 21, 1975, Ser. No. 551,872
Int. Cl.² C09B 45/00; D06P 1/10
U.S. Cl. 8—42 R **25 Claims**

1. A stable, concentrated substantially anhydrous solution of a metal complex azo dyestuff, wherein the solution contains 10 to 60% by weight of at least one heavy metal complex azo or azomethine dyestuff containing a sulfonic acid group, dissolved in 90 to 40% by weight of at least two water-miscible, organic solvents which are liquid at room temperature, selected from the group consisting of mono or polyalkylene glycol or thioglycol or ether thereof, a hydroxylated ketone, a cyclic ether, a lactam, lactone, dimethyl sulfoxide, sulfolan, sulfolene, hexamethylphosphoric acid triamide, dimethyl methyl phosphonate, N-methylpyrrolidone and a low molecular aliphatic carboxylic acid amide.

3,989,453
MULTICOLORING POLYESTER TEXTILE MATERIALS WITH ACID DYES

Dara Ardeshir Jilla, Collinsville, Va., assignor to Martin Processing Company, Inc., Martinsville, Va.

Filed Jan. 11, 1974, Ser. No. 432,645
Int. Cl.² D06B 21/00; C09B 27/00
U.S. Cl. 8—66 **18 Claims**

1. A process of making a multicolored polyester material dyed with acid dyes for use as the face yarn of carpets, upholstery of apparel fabric, which comprises taking a polyester material that has first been pretreated with a mixture of (1) an organic nitrogen compound and (2) a glycol, an alcohol, a ketone, an ether, or water to impart thereto an affinity for acid dyes, contacting the said pretreated polyester material with an aqueous solution or a printing paste of (A) a condensation product of (a) formaldehyde and (b) naphthalene-sulfonic acid, phenol, sulfonated phenol, diaryl sulfone, urea, melamine, or dicyandiamide; and (B) a fiber-reactive compound which contains a chromophore, and has attached to it a reactive group which reacts readily with a nitrogen atom of the

above-mentioned pretreated polyester material having an affinity for acid dyes, and then exposing same to steam or dry heat at a temperature between 100° C and 200° C for a period of 20 seconds to 20 minutes, thereby imparting to the treated polyester material ability to "resist" acid type dyes, and thereafter over-dyeing the thus-treated polyester material with acid dyes.

3,989,454

PROCESS FOR CONTROLLING THE MACROMOLECULAR REACTIVITIES OF COTTON AND MERCERIZED COTTON

Jett C. Arthur, Jr., Metairie, La.; Yoshio Nakamura, Kiryu, Japan, and Oscar Hinojosa, Metairie, La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sept. 28, 1973, Ser. No. 401,773

Int. Cl.² D06M *13/20*

U.S. Cl. 8—120 1 Claim

1. In a process for producing cotton-poly(ethyl acrylate) copolymer textile and mercerized cotton-poly(ethyl acrylate) copolymer textile wherein cotton textile and mercerized cotton textile are dried, irradiated with ionizing radiation, impregnated with a solution of ethyl acrylate in a solvent consisting essentially of methanol and water, allowed to react with said ethyl acrylate, and the cotton-poly(ethyl acrylate) copolymer textile and the mercerized cotton-poly(ethyl acrylate) copolymer textile then recovered, the improvement which comprises employing one treating procedure for both cotton and mercerized cotton using one treating solution or both containing about 65 volume percent methanol and about 35 volume percent water in said solvent, thereby permitting cotton and mercerized cotton polymer textiles having the same grafted polymer add-on to be produced under the same reaction conditions when being treated simultaneously under the same conditions or being treated separately under the same reaction conditions, thereby producing cotton and mercerized cotton polymer textiles that have the same grafted polymer add-on.

3,989,455

TERTIARY AMINES, SUBSTITUTED PIPERIDINE, MORPHOLINE OR PIPERAZINE CONTAINING FATTY ACID MOIETIES TO PREVENT OZONE FADING OF NYLON FIBERS

Robert Alden Lofquist, and John Christopher Haylock, both of Richmond, Va., assignors to Allied Chemical Corporation, Petersburg, Va.

Continuation-in-part of Ser. No. 364,788, May 29, 1973, abandoned. This application Nov. 4, 1974, Ser. No. 520,704

Int. Cl.² D06P *5/00, 5/02*

U.S. Cl. 8—165 2 Claims

1. A method of treating polycarbonamide fibers to increase dye fastness of basic and disperse anthraquinone dyestuffs applied in an aqueous dyebath when said fibers are dyed and exposed to ozone comprising

coating said fibers prior to dyeing with from about 0.5 percent to about 4.0 percent on weight of fiber of a compound selected from the group consisting of

where R_1 is straight or branched alkyl, alkenyl or aralkyl having 6 to 24 carbon atoms; R_2 is the same as R_1, another R_1 or a straight or branched chain alkyl or alkenyl having one to six carbon atoms; R_3 is the same as R_2 or another R_2; the total carbon atoms in R_1, R_2, and R_3 must be at least 15 and less than 40; and R_1, R_2, and R_3 can contain up to 2 unsaturated carbon to carbon bonds, said coating remaining on said fibers after all subsequent processing.

3,989,456

DYEING OF POLYESTER FIBERS

Michele Vescia, Limburgerhof; Manfred Daeuble, Frankenthal, and Rudi Widder, Leimen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Mar. 6, 1975, Ser. No. 556,019

Claims priority, application Germany, Mar. 22, 1974, 2413866

Int. Cl.² D06P *5/04*

U.S. Cl. 8—169 9 Claims

1. In a process for dyeing polyester fibers in water with a disperse dye at a temperature above 100° C, the improvement in obtaining a level dyeing which comprises:

carrying out the dyeing of said fibers from an aqueous liquor containing, in addition to the disperse dye, from 0.05 to 0.5 percent by weight of an aliphatic alcohol of 8 to 12 carbon atoms in the form of an emulsion as the essential leveling agent.

3,989,457

FINISHING PROCESSES FOR TEXTILE MATERIALS

Walter Marte, Ulisbach, Switzerland, assignor to Heberlein & Co. AG, Wattwil, Switzerland

Filed Mar. 17, 1975, Ser. No. 558,645

Claims priority, application Switzerland, Mar. 22, 1974, 4016/74

Int. Cl.² D06M *13/00, 15/08*

U.S. Cl. 8—182 14 Claims

1. A process for obtaining finishing effects with improved surface properties on textile material consisting at least partially of cellulose fibers, the process comprising the steps of applying to the textile material a finishing agent, capable of cross-linking with the hydroxy groups of said cellulose fibers, and a reaction catalyst in a carrier containing a mixture of water and at least one organic solvent selected from the group consisting of aliphatic alcohols of 1 and 8 carbon atoms in the chain, low aliphatic ketones and low aliphatic esters, controlling the stability of said mixture by the salting-out or salting-in effect of a substance selected from the group consisting of neutral salts, acid salts, potentially acid salts and organic acids, whereby, upon application of said finishing agent in said carrier to said textile material, a phase separation between aqueous and solvent phases is effected and whereby a concentration of said finishing agent and of said reaction catalyst passing into the aqueous phase is effected in the interior of the cellulosic fibers of said textile material, and heating said textile material to produce a wash-resistant fixation of said finishing agent in said textile material.

3,989,458

COMPOSITIONS CONTAINING BISULPHITE ADDUCTS OF POLYISOCYANATES AND METHOD OF USE

Geoffrey Bruce Guise, Highton, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Australia

Filed Aug. 9, 1974, Ser. No. 496,189

Claims priority, application Australia, Aug. 15, 1973, 4494/73

The portion of the term of this patent subsequent to Aug. 5, 1992, has been disclaimed.

Int. Cl.[2] C08G *18/80*; D06M *15/08*; C08L *75/08*

U.S. Cl. 8—192 16 Claims

1. A composition comprising (1) at least one bisulphite addition product of a polyisocyanate prepolymer or a polyisothiocyanate prepolymer, said addition product having an average at least two isocyanate-bisulphite or isothiocyanate-bisulphite adduct groups per molecule having no free isocyanate or isothiocyanate groups, and being freely water-soluble; said prepolymer being the water-insoluble reaction product of a polyisocyanate or polyisothiocyanate and a polyhydroxy compound; and (2) at least one of the compounds:

a. at least one mineral acid;

b. at least one material capable of releasing, in aqueous solution, (a) mineral acid(s);

c. at least one oxidizing agent;

d. at least one material capable of releasing, in aqueous solution, (an) oxidizing agent(s); or

e. a mixture of two or more of (a), (b), (c) and (d).

3,989,459

METHOD OF PREVENTING CORROSION OF STEELWORKS

Yoshiharu Nose, Kawasaki; Toshiyuki Fukushima, Yokohama; Yukio Matsuzaki, Fujisawa, and Hiroshi Uemura, Machida, all of Japan, assignors to Nippon Oil Company Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 274,476, July 24, 1972, abandoned, which is a continuation-in-part of Ser. No. 72,852, Sept. 16, 1970, abandoned. This application Apr. 2, 1975, Ser. No. 564,457

Claims priority, application Japan, Sept. 24, 1969, 44-76127

Int. Cl.[2] C23F *11/08*, *11/18*

U.S. Cl. 21—2.7 R 5 Claims

1. A method of preventing corrosion of steelworks by a flowing corrosive solution having a pH of 6.7 to 7.1 and comprising water, ammonia in a concentration of from 0.5 to 4 mols per liter of solution and hydrogen sulfide in a concentration of from 5 to 15 kg/cm^2 as its partial pressure in the vapor phase, said corrosive solution contacting said steelwork at a flow velocity of from 1 to 10 meters per second which comprises adding at least one substance selected from the group consisting of elemental sulfur, ammonium polysulfide and alkali polysulfide to said corrosive solution in an amount of 74–200 ppm as the amount of available sulfur.

3,989,460

WATER SOLUBLE WATERFLOOD CORROSION INHIBITOR

Philip Merchant, Jr.; Cosmas O. Ohaji, and F. Luther Powell, all of Houston, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Sept. 10, 1975, Ser. No. 611,993

Int. Cl.[2] C23F *9/00*

U.S. Cl. 21—2.7 R 13 Claims

1. A water-soluble corrosion inhibiting composition, particularly useful in waterflooding environments in which the water is a brine, which comprises from 45 to 90 wt. % of a heterocyclic nitrogen hydrochloride selected from the group consisting of alkyl piperazine hydrochlorides and alkyl pyridine hydrochlorides, from 2 to 40 wt. % of a polyethoxylated derivative from long chain alcohols and long chain acids wherein said derivative has both hydrocarbon portions and polyethoxylated portions, said hydrocarbon portion being at least 12 carbon atoms and said polyethoxylated portions having an average length of about 8 to 30 ethylene oxide units, and the balance water.

8. A method for reducing the corrosiveness of oil well fluids toward ferrous metals coming into contact with said fluids which comprises mixing into said fluids a corrosion inhibiting amount of the corrosion inhibitor of claim 1, wherein the amount of said composition in said well fluid is at least about 10 ppm.

3,989,461

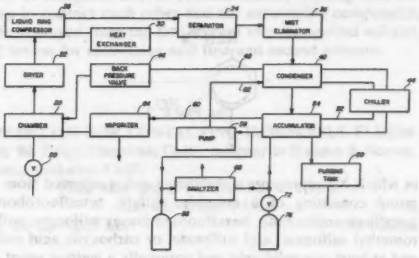
APPARATUS FOR USE, RECOVERY, RECONSTITUTION, AND RECYCLIZATION OF STERILANT GAS MIXTURE

Russell Skocypec, Homewood; Joseph C. Crowther, Jr., Hazel Crest, and Richard J. Cimaroli, South Holland, all of Ill., assignors to Vacudynealtair, Inc., Chicago Heights, Ill.

Filed Mar. 3, 1975, Ser. No. 554,540

Int. Cl.[2] A61L *3/00*, *3/02*, *13/00*

U.S. Cl. 21—91 8 Claims



2. In an apparatus for gaseous sterilization and including a treatment chamber for containing articles and an alkylene oxide gaseous sterilizing agent for controlled exposure of said articles to said agent,

means for introducing said sterilizing agent into and means for discharging said sterilizing agent from said chamber,

condenser means for converting gas discharged from said chamber into a liquid phase for storage, reconstitution and reintroduction into and re-use in said chamber,

the improvement wherein said condenser means includes a liquid ring compressor having a liquid sealant comprising a polyhydric alcohol.

8. Apparatus for the gaseous sterilization of articles comprising

a sterilizing chamber for containing the articles and a gaseous sterilizing agent for controlled exposure of said articles thereto,

means for introducing said gaseous sterilizing agent into and means for evacuating said gaseous agent from said chamber,

condenser means for converting gas discharged from said chamber into a liquid phase for storage, reconstitution and reintroduction into and re-use in said chamber, and

gas recycle conduit means interconnecting said condenser means with said chamber to return to said chamber, throughout a sterilant reclamation cycle, a portion of gases discharged from the chamber and delivered to said condenser means, said portion of gases including all non-condensable gases as well as sterilant gases not condensed under the operating conditions of said condenser means, thereby to preclude excessive gas losses through venting at said condenser means, and to maintain gaseous pressure in said chamber during evacuation thereof above a selectable predetermined minimum value,

whereby expansive explosion of articles contained in said chamber during evacuation is precluded, and whereby

any need for auxiliary vacuum producing apparatus is obviated,

said condenser means including condenser coils and a condensate discharge means, and

pump means operatively connected to said discharge means to return a portion of the condensate to said condenser means to impinge on said condenser coils thereof, thereby to wash from the outer surface of said coils any non-condensable film deposited thereon.

3,989,462

TEST COMPOSITION FOR DETECTING UROBILINOGEN

Wolfgang Hirsch, Luthe, Germany, assignor to Riedel-de Haen Aktiengesellschaft, Seelze, Hannover, Germany

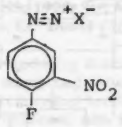
Filed May 10, 1976, Ser. No. 684,798

Claims priority, application Germany, May 14, 1975, 2521402

Int. Cl.² G01N *21/06, 31/22, 33/16*

U.S. Cl. 23—253 TP **7 Claims**

1. Test composition for detecting urobilinogen in liquids, preferably in biological fluids, especially in urine, comprising a diazonium salt of the formula I



in which X^- represents a stabilizing anion selected from the group consisting of a chloride, sulfate, tetrafluoroborate, hexafluoroantimonate, hexafluoroantimony sulfonate, trifluoromethyl sulfonate, aryl sulfonate, or carboxylic acid radical and at least one solid acid and optionally a wetting agent and one or several stabilizers.

3,989,463

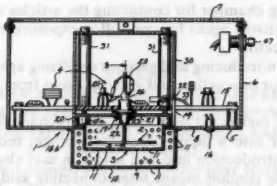
SENSING ELEMENT AND DETECTION SYSTEM EMPLOYING SUCH ELEMENT FOR DETECTION OF ENVIRONMENTAL BORNE MATERIAL

Carl F. Klein, Milwaukee; Paul E. Thoma, Burlington, both of Wis., and Gerald E. Weber, Ben Brook, Tex., assignors to Johnson Controls, Inc., Milwaukee, Wis.

Continuation-in-part of Ser. No. 445,488, Feb. 25, 1974, abandoned. This application Aug. 26, 1975, Ser. No. 607,892

Int. Cl.² G01N *27/00, 31/00;* **G08B** *21/00;* **H01G** *5/00*

U.S. Cl. 23—254 E **25 Claims**



1. An environmental gaseous product capacitance sensing apparatus for detecting the presence of environmental borne contaminating products, comprising a pair of spaced capacitance electrode means separated by an essentially non-conductive free space, a first of said electrode means comprised of a material having an oxidized surface layer less than 1000 microinches thick, said material being electrically conductive and forming a limited reactive layer in the surrounding environment, said surface layer reacting with said contaminating products to define a sensing electrode means.

3,989,464

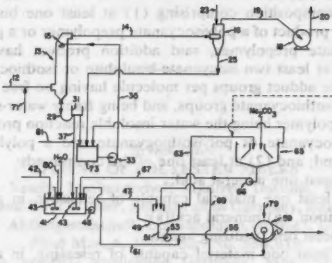
SULFUR DIOXIDE SCRUBBING SYSTEM

Donald A. Dahlstrom, and Conrad F. Cornell, both of Salt Lake City, Utah, assignors to Envirotech Corporation, Menlo Park, Calif.

Division of Ser. No. 353,260, April 23, 1973, Pat. No. 3,873,532. This application Feb. 24, 1975, Ser. No. 552,407

Int. Cl.² B01J *1/00, 8/00*

U.S. Cl. 23—260 **11 Claims**



1. A continuous system for removing sulfur-dioxide from a gaseous stream by alkaline hydroxide scrubbing and for recausticizing the spent scrubbing liquor with a calcium compound comprising, in combination:

a. a wet-type gas scrubbing device having an inlet for a gaseous stream to be scrubbed, means for introducing scrubbing liquid into the gaseous stream, a body section wherein the gases are scrubbed, an outlet for the scrubbed gases, and a separate outlet for spent scrubbing liquid;

b. a first reaction means, first liquid conveying means for conveying the spent scrubbing liquor from said scrubbing device to said first reaction means and means for feeding a stream of calcium-bearing solids to said first reaction means; said first reaction means including a tank having a reaction zone formed therein and mixing means for mixing the spent scrubbing liquor with the feed solids for recausticizing, said first reaction means further including a settling zone in liquid-flow communication with said reaction zone for receiving said products; said first reaction means still further including means for recycling a portion of the sediment from said settling zone to said reaction zone;

c. second conveying means for conveying sediment from said settling zone in said first reaction means;

d. a dewatering device connected to said second conveying means for removing liquid from the sediment;

e. a second reaction means connected to receive clarified liquid from said settling zone of said first reaction means, and first carbonating material feed means for feeding carbonating material to said second reaction means in order to precipitate dissolved calcium from the clarified liquid as calcium carbonate; said second reaction means including a tank having a reaction zone formed therein and mixing means for mixing the carbonate material with the clarified liquid and a settling zone in liquid-flow communication with said reaction zone for receiving and holding the reaction products;

f. third conveying means for removing sediment from the settling zone of said second reaction means; and

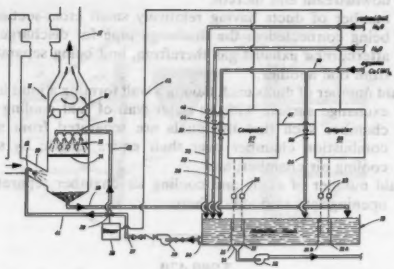
g. fourth conveying means for conveying clarified liquid from said second reaction means to said means for introducing scrubbing liquid to said scrubbing device.

3,989,465

APPARATUS FOR CONTROLLING REACTION CONDITIONS IN A SULFUR DIOXIDE SCRUBBER

James H. Onnen, Louisville, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.

Division of Ser. No. 338,762, March 7, 1973, Pat. No. 3,897,540. This application Apr. 7, 1975, Ser. No. 565,419
Int. Cl.[2] B01J *10/00*; C01B *17/58*; G01N *27/26*
U.S. Cl. 23—260 4 Claims



1. A system for removing sulfur dioxide from an industrial stack gas stream resulting from the combination of fossil fuels comprising: wet scrubbing means for contacting and reacting an industrial stack gas stream in a scrubbing zone thereof with a first aqueous medium having a sulfur dioxide reactant material thereby forming an initial reaction product, said wet scrubbing means including a stack gas inlet, a stack gas outlet, inlet means for introducing said first aqueous medium to said scrubber, and, an initial reaction product discharge outlet;

means for regulating the rate at which said first aqueous medium is circulated to said contact zone through said first aqueous inlet means;

means for transferring said initial reaction product from said wet scrubbing means to a reaction tank;

said reaction tank including means for introducing a second aqueous medium having a sulfur dioxide reactant material therein whereby said initial reaction product is further reacted to form a second more stable reaction product by further reaction resulting in dissolved and precipitated sulfates and sulfites being removed therefrom;

first means for sensing the pH of said reaction conditions inside said reaction tank at a first location therein;

means for comparing said sensed pH with a desired pH;

first means for regulating the addition of a first portion of said second aqueous medium in response to said comparing means, said first portion of said second aqueous medium being introduced downstream of said first pH sensing means;

second means for sensing said pH of said reaction conditions inside said reaction tank downstream of said first means and said means for introducing said first portion of said second aqueous medium; and,

second means for regulating the addition of a second portion of said second aqueous medium in response to said comparing means to maintain the liquid level in said reaction tank and adjust the composition of a resulting aqueous medium to a desired pH level, said second portion of said second aqueous medium being introduced downstream of said second pH sensing means;

means for recirculating a portion of said resulting aqueous solution from said reaction tank to said wet scrubbing means, said recirculating means being connected to said tank downstream of the point of introducing said second portion of said second aqueous medium; and,

means for removal of said solid precipitates from said reaction tank.

3,989,466

LIQUID-LIQUID EXTRACTION APPARATUS INCLUDING FIBROUS STRAND PACKING

Samuel C. Pan, 28 Beacon Hill Drive, Metuchen, N.J. 08840

Filed Aug. 13, 1973, Ser. No. 388,045
Int. Cl.[2] B01D *11/00*, *15/02*, *59/22*
U.S. Cl. 23—267 R 7 Claims

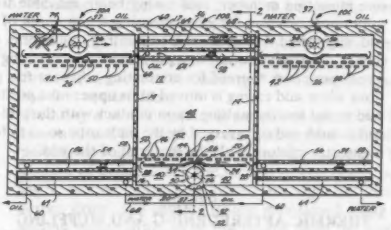
1. Apparatus for use in carrying out liquid-liquid extractions, comprising a column defining an elongated contacting area, a first set of a plurality of elongated loosely packed fibrous strands of yarn comprising natural or synthetic fibers capable of sorbing a solvent and containing a plurality of capillaries or interstitial spaces capable of sorbing a solvent, longitudinally arranged in said column, a first separation zone, means for feeding a first solvent, including a component to be extracted, into said column and causing first solvent to flow through said column through said plurality of elongated fibrous strands a portion of which is sorbed in said capillaries or interstitial spaces, and the remainder of which flows into said separation zone, means for feeding a second solvent which is at least partially immiscible with said first solvent into said separation zone and through annular spaces of said plurality of elongated fibrous strands, thereby causing said solvents to contact each other and the extractable components to be removed from the first solvent into the second solvent, and means for recovering said first and second solvents.

3,989,467

APPARATUS FOR CONTACTING IMMISCIBLE FLUIDS

Peter M. Paige, Placentia, Calif., assignor to Holmes & Narver, Inc., Anaheim, Calif.

Filed May 24, 1974, Ser. No. 472,956
Int. Cl.[2] B01D *11/04*
U.S. Cl. 23—267 MS 13 Claims



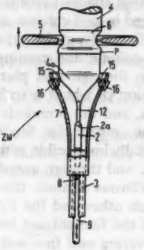
1. Apparatus for contacting a first liquid with a second heavier liquid which is substantially insoluble in the first, the apparatus comprising a mixing sump having an inlet and an outlet, means for admitting the two liquids into the sump inlet, means for mixing the two liquids in the sump, an elongated substantially horizontal retention channel having an inlet and outlet, the channel inlet being connected to the sump outlet, the bottom of the sump and of the retention channel being at substantially the same level, the horizontal distance between the channel inlet and outlet being substantially greater than the depth of the channel, a settling tank with a substantially horizontal bottom at substantially the same level as the bottom of the retention channel, the settling tank having an inlet connected to the channel outlet, and outlet means for separately removing separated first and second liquid from the settling tank so that liquid flows through the settling tank from the inlet to the outlet, the sump, channel and settling tank having substantially the same depth.

3,989,468

APPARATUS FOR CRUCIBLE-FREE ZONE MELTING OF SEMICONDUCTOR CRYSTAL RODS

Wolfgang Keller, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Division of Ser. No. 525,641, Nov. 20, 1974, Pat. No. 3,923,468. This application Dec. 5, 1975, Ser. No. 637,986
Claims priority, application Germany, Nov. 22, 1973, 2358300
Int. Cl.² B01J 17/10; C01B 33/02
U.S. Cl. 23—273 SP 3 Claims



1. In a device for crucible-free zone melt processing of a semiconductor crystal rod comprising:

an operative crucible-free zone melt apparatus including two vertically opposing approximately coaxially mounted members for supporting a semiconductor rod within said apparatus, a means for generating an annular melt zone on a portion of said semiconductor rod and a means for moving said melt zone along the length of said rod; the improvement comprising

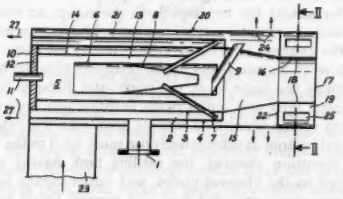
a funnel-shaped casing coupled to one of said mounting members in an axially movable manner in relation to said one mounting member, said casing being movable to an uppermost position for encompassing a cone area of the rod supported between said mounting members, and having relatively low melting pure metal inserts along the upper periphery thereof for contacting adjacent rod portions when said casing is moved to its uppermost position, said metal inserts melting upon contact with the still-hot rod as such rod is traversed by the melt zone so as to form a eutectic mixture with the material of the rod.

3,989,469

THERMIC AFTERBURNING AND MUFFLING APPARATUS FOR INTERNAL COMBUSTION ENGINES

Hans Karl Leistritz, Kussaberg, Germany, assignor to Anstalt fur Verbrennungsmotoren, Prof. Dr. h.c. Hans List, Austria

Filed June 7, 1974, Ser. No. 477,345
Claims priority, application Germany, June 12, 1973, 2329824; Aug. 1, 1973, 2338886
Int. Cl.² F01N 3/14; F23G 7/06
U.S. Cl. 23—277 C 5 Claims



1. Apparatus for the thermic afterburning and muffling of the exhaust gases of internal combustion engines, comprising:

an elongated counterflow combustion chamber receiving the exhaust gases to be afterburned and additional combustion air at its upstream end;

a cooling air chamber encircling said combustion chamber, said cooling air chamber including means for receiving cooling air and means for discharging heated cooling air into the atmosphere, said cooling chamber directing a portion of the heated cooling air into said combustion chamber as said additional combustion air at the upstream end of the combustion chamber;

said combustion chamber including a discharge pipe at the downstream end thereof;

a number of ducts having relatively small cross-sections, being connected to the discharge pipe for discharge of afterburned exhaust gas therefrom, and being separated from one another;

said number of ducts each having a wall forming a joint heat exchange surface with an outer wall of said cooling air chamber such that the ducts are separated from said combustion chamber over their entire length; by said cooling air chamber; and

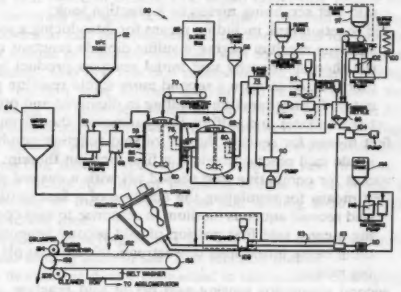
said number of ducts and cooling air chamber separately opening into said atmosphere.

3,989,470

APPARATUS FOR THE PRODUCTION OF FOAMED FERTILIZERS

Richard H. Czurak, Marysville, and Robert M. Thompson, Richwood, both of Ohio, assignors to O. M. Scott & Sons Company, Marysville, Ohio

Continuation-in-part of Ser. No. 850,489, Aug. 15, 1969, Pat. No. 3,705,794. This application Dec. 11, 1972, Ser. No. 314,262
Int. Cl.² C05C 9/02
U.S. Cl. 23—259.3 24 Claims



1. Apparatus for producing a self-granulated, foamed, particulate, urea-formaldehyde fertilizer comprising:

a. means for preparing a foamed urea-formaldehyde solution in which the urea and formaldehyde are at least partially condensed to methylol ureas;

b. means for curing the methylol ureas to predominantly methylene ureas while simultaneously expanding said solution and for then drying said foamed solution to a self-granulated, solid material;

c. means for comminuting the dried material to thereby reduce said material to particulate form; and

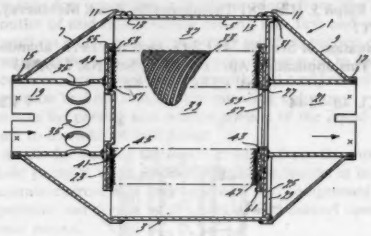
d. means for blending adjuvants and other constituents with said dry, particulate material.

3,989,471

RADIAL FLOW CATALYTIC CONVERTER HAVING THERMAL EXPANSION COMPENSATING MEANS

Hubert H. Nowak, Jackson, Mich., assignor to Tenneco Inc., Racine, Wis.

Filed Apr. 14, 1975, Ser. No. 567,577
Int. Cl.² F01N 3/15, 7/00
U.S. Cl. 23—288 FC 2 Claims



1. A catalytic converter for combustion engine exhaust systems comprising an elongated metal shell having its opposite ends open, a pair of end caps fixedly secured respectively to said shell at opposite ends, one of said end caps having a port therein providing an inlet for gas to enter the shell and the other having a port therein providing an outlet for gas to leave the shell, a metal inlet gas flow tube secured at its outer end to said inlet end cap, a metal outlet gas flow tube secured at its outer end to said outlet end cap, a pair of transverse partitions secured respectively to the inner ends of the flow tubes, a catalyst element in said housing including an annular refractory gas pervious monolithic substrate having a relatively low rate of thermal expansion compared to that of said metal shell and extending between and mounted at opposite ends on said transverse partitions, said substrate being substantially smaller in diameter than said shell and having inlet and outlet faces that are substantially cylindrical in shape and radially disposed with respect to each other such that the exhaust gas flows radially through the substrate from the inlet to the outlet face, at least one of said gas flow tubes being composed of metal having a substantially greater rate of thermal expansion than the metal of said shell and the partition secured thereto being longitudinally movable with respect to said shell to provide a thermal compensating means to at least partially offset the difference in thermal expansion between the substrate and metal shell.

3,989,472

METHOD FOR PRODUCING HIGH BULK DENSITY MAGNESIUM CHLORIDE

David G. Braithwaite, Brookhaven, Miss., and William P. Hettinger, Jr., Sudbury, Mass., assignors to NL Industries, Inc., New York, N.Y.

Filed July 7, 1975, Ser. No. 593,679
Int. Cl.² B01J 2/02
U.S. Cl. 23—293 A 5 Claims

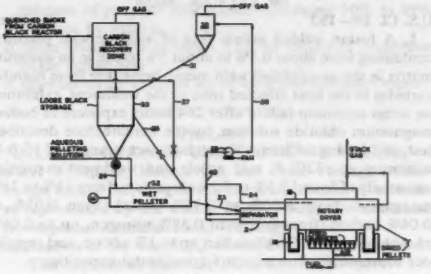
1. Method for producing substantially anhydrous magnesium chloride of relatively high bulk density from a foamable, magnesium chloride brine solution comprising the steps of: adding an anti-foaming agent to said brine solution in amounts from 200–1000 ppm, said anti-foaming agent comprising a polyglycol fatty acid and then spray drying said solution.

3,989,473

METHOD FOR PELLETING CARBON BLACK

Eulas W. Henderson, Toledo, Ohio, assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 298,659, Oct. 18, 1972, abandoned. This application Dec. 2, 1974, Ser. No. 528,767
Int. Cl.² C09C 1/58, 1/60
U.S. Cl. 23—314 1 Claim



1. A method for treating carbon black to obtain pellets within a desired size, said method comprising:

1. Pelleting a mass of particles;
2. Classifying the pelleted mass to remove therefrom pellets which are larger than a desired size range and pellets which are smaller than a desired size range, said classifying by:
   a. Directing a stream of pellets comprised of a multiplicity of different sized pellets into a first, innermost screen drum;
   b. Rotating the first screen drum for passing the pellets along the first screen drum;
   c. Passing a portion of the pellets through the first screen drum, and causing larger pellets maintained along the first screen drum to be discharged from the first end of the first screen drum;
   d. Rotating a second screen drum positioned about first screen drum for receiving the first portion of pellets passing through the first screen drum, passing the first portion of pellets along the second screen drum, passing a second portion of pellets through the second screen drum, and causing pellets maintained along the second screen drum to be discharged from the second end of said second screen drum;
   e. Rotating an outer member positioned about said second screen drum for receiving the second portion of pellets, passing the second portion of pellets along the outer member, and discharging said second portion of pellets from the first end of said outer member, said pellets being discharged from the second end of the second screen drum being of a preselected size range intermediate the pellets being discharged from the first end; and
   f. Passing the pellets discharged from the second end of the second screen drum into a dryer wherein said pellets discharged from the second end of the second screen drum are dried;
3. Passing the remaining pellets, said pellets being of the desired size range, to a drying zone;
4. Recycling said pellets which are larger than the desired size and pellets smaller than the desired size range to the pelleting operation with the aid of a gas taken from a drying zone in a manner to cause disintegration of the pellets; and
5. Repelleting the recycled material.

3,989,474

AUSTENITIC STAINLESS STEEL

George N. Goller, Towson, and Ronald E. Espy, Randallstown, both of Md., assignors to Armco Steel Corporation, Middletown, Ohio

Division of Ser. No. 445,482, Feb. 25, 1974, Pat. No. 3,940,266, which is a continuation of Ser. No. 238,862, March 28, 1972, abandoned, which is a continuation-in-part of Ser. No. 868,893, Oct. 23, 1969, abandoned. This application Oct. 20, 1975, Ser. No. 623,963

Int. Cl.² C22C *38/58*

U.S. Cl. 29—193 8 Claims

1. A fusion welded article free of weld deposit porosity, containing from about 0.5% to about 5% ferrite in an austenite matrix in the as-solidified weld metal, being free from harmful carbides in the heat affected zone of the weldment, exhibiting no stress corrosion failure after 264 hours exposure to boiling magnesium chloride solution, by the hereinbefore described test, and having a Charpy V-notch impact strength of 15 ft-lb minimum at −320° F, said article and weldment consisting essentially of from 15.5% to 20% chromium, from 11% to 14% manganese, from 2.50% to 3.75% nickel, from 0.01% to 0.06% carbon, from 0.20% to 0.38% nitrogen, up to 0.06% phosphorus, up to 0.04% sulfur, up to 1% silicon, and remainder substantially iron except for incidental impurities.

3,989,475

COMPOSITE SUPERCONDUCTORS

David G. Howe, Greenbelt, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 30, 1975, Ser. No. 582,503

Int. Cl.² B32B *15/00*

U.S. Cl. 29—194 2 Claims

1. A composite superconductor which comprises:

a first outer layer of an alloy selected from the group consisting of vanadium-gallium (V—Ga) with a gallium content from 12.5 at. % to 17.5 at. %, niobium-tin (Nb—Sn) with a tin content from 12 at. % to 17.5 at. %, and a vanadium-silicon (V-Si) with a silicon content from 10.0 at. % to 20 at. %;

a second outer layer of an alloy selected from the group consisting of copper-gallium (Cu—Ga) alloy with a gallium content of 22 at. % < Ga 30.0 at. %, a copper-tin (Cu—Sn) alloy with 11 at. % < Sn 21.0 at. %, and a copper-silicon (Cu-Si) alloy with 14 at. % < Si 21 at. % so that said second alloy has the same metal solute as said first alloy; and

an intermediate layer of an A-15 intermetallic compound which is produced by a solid state reaction between said outer layers of alloys.

3,989,476

FUELS CONTAINING N-SUBSTITUTED MORPHOLINES

Franklin Paul Abbott, Brooklyn, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 480,764, June 19, 1974, abandoned. This application Oct. 31, 1975, Ser. No. 627,575

Int. Cl.² C10L *1/26*

U.S. Cl. 44—63 10 Claims

1. A fuel composition containing a major amount of a normally liquid fuel and a minor but detergent-producing amount of at least one N-substituted morpholine of the formula

$$O(CH_2CH_2)_2NR'YR''$$

wherein R′ is a divalent hydrocarbyl organic radical of at least one to about 30 carbon atoms, Y is —O—, —S—,

and R″ is a hydrocarbyl radical of at least about 20 carbon atoms.

3,989,477

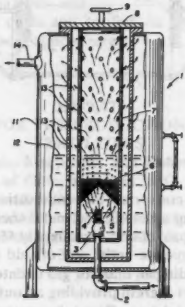
GAS ENRICHING APPARATUS

Stanley C. Wilson, 465 Jefferson Ave., Washington, Pa. 15301, and Ralph J. Hils, 281 Thompsonville Road, McMurray, Pa. 15317

Continuation of Ser. No. 411,343, Oct. 31, 1973, abandoned. This application Apr. 10, 1975, Ser. No. 566,803

Int. Cl.² C10J *1/08*

U.S. Cl. 48—144 7 Claims



1. A gas enricher comprising a container having a removable lid, an inverted cone shaped foraminous base therein supporting a bed of petro-chemical solid elements, which material, when dissolved in gasoline, liberates a gas, said container having vertical sidewalls which are perforated at a level above said foraminous base and being surrounded by a tank partially filled with gasoline which completely immerses said bed and foraminous base, means providing a source of compressed gas leading to an inlet pipe in the interior of said container directly beneath said bed, and an outlet pipe at the top of said tank, whereby when said gas is passed through said bed, it will mix with the gas generated by said dissolving solid elements to provide enriched, combustible gas above the surface of said gasoline which flows through said perforated sidewalls and through said outlet pipe.

3,989,478

PRODUCING GASEOUS FUELS OF HIGH CALORIFIC VALUE

James Kevin Jones, Stalybridge, England, assignor to Petrocarbon Developments Limited, Manchester, England

Continuation-in-part of Ser. No. 447,887, March 4, 1974, abandoned. This application Mar. 24, 1976, Ser. No. 669,886

Claims priority, application United Kingdom, Sept. 27, 1973, 45364/73

Int. Cl.² C10J *1/00*

U.S. Cl. 48—196 R 17 Claims

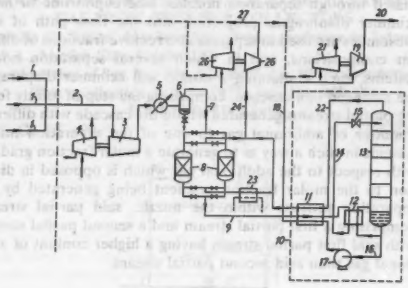
10. Apparatus for upgrading an air-contaminated methane composition, said apparatus comprising in combination:

a. first, second and third compression means each having a gas inlet and a gas outlet,

b. gas-fuelled prime mover means for driving said first, second and third compression means,

c. indirect countercurrent heat exchange means,

d. expansion valve means,
e. a fractionating column having an inlet, a liquid outlet below said inlet and a gas outlet above said inlet,
f. a pump having an inlet and outlet,
g. means for feeding said composition to the inlet of said first compression means,
h. means for passing compressed composition from the outlet of said first compression means through said indirect countercurrent heat exchange means and then through said expansion valve means where it is expanded to a lower pressure and thence to the inlet of said fractionating column,
i. means for separating a liquid product from the liquid outlet of said fractionating column into first and second portions, and means for recycling said first portion of said product through said heat exchange means in indirect countercurrent heat exchange with said compressed composition and back to the fractionating column,
j. means for passing said second portion of the liquid product to the inlet of said pump,
k. means for passing the liquid product from the outlet of said pump through said heat exchange means in indirect countercurrent heat exchange with said compressed composition and thence to the inlet of said second compression means,



l. means for recovering a compressed fuel gas from the outlet of said second compression means, m) means for recoverng a gaseous product from the gas outlet of said fractionating column passing it through said m. exchange means in indirect countercurrent heat exchange with said compressed composition and thence to the inlet of said third compression means, and
n. means for recovering a compressed lean fuel gas from the outlet of said third compression means and for feeding said gas as fuel to said prime mover means,

said indirect countercurrent heat exchange means including first and second heat exchangers and in which said first heat exchanger contains first passage means for the passage therethrough of said compressed composition and second and third passage means for the passage therethrough respectively of said gaseous product and said second portion of said liquid product each in countercurrent to said compressed composition, and said second heat exchanger contains first passage means the inlet of which is connected to the outlet of said first passage means of said first heat exchanger for the passage therethrough of said compressed composition after it has traversed said first heat exchanger and second passage means for the passage therethrough of said first portion of said liquid product in countercurrent to said compressed composition.

3,989,479
GASEOUS FUEL MIXTURE

Samuel H. White, Fort Lauderdale, Fla., assignor to Anne Joffre White, Fort Lauderdale, Fla.

Filed Sept. 25, 1973, Ser. No. 400,689
Int. Cl.² C10L 3/00
U.S. Cl. 48—197 FM 1 Claim

1. A fuel gas consisting essentially of a gaseous mixture of:
a. from about 80% to about 82% by weight of a member selected from the group consisting of propane, and a mixture of propane and butane containing 50% to 99% propane by weight;
b. from about 15% to about 17% by weight of propylene oxide vapor; and
c. from about 2% to about 4% by weight of methanol vapor.

3,989,480
DECOMPOSITION OF CARBOHYDRATE WASTES

Herbert R. Appell, Monroeville, and Peter Pantages, Pittsburgh, both of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

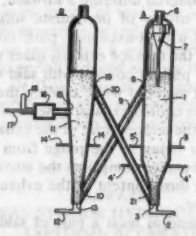
Continuation of Ser. No. 503,544, Sept. 5, 1974, abandoned.
This application Mar. 25, 1976, Ser. No. 670,479
Int. Cl.² C10J 3/00
U.S. Cl. 48—209 8 Claims

1. A process, for decomposing carbohydrate waste materials to form a gaseous fuel product consisting essentially of impregnating the waste material with a nonaqueous solution of a catalytic metal from the group consisting of nickel, cobalt, rhodium, iridium, palladium platinum and alloys of coppernickel and of nickel-iron-chromium and heating to a temperature of about 400° to 900° C. for a period of time sufficient to decompose a substantial portion of the carbohydrate to hydrogen and carbon monoxide in about equal proportions by volume.

3,989,481
CONTINUOUS CATALYTIC GASIFICATION OF HEAVY HYDROCARBON OILS WITH RECIRCULATED FLUIDIZED CATALYST

Daizo Kunii, 1-25-16, Nakamachi, Meguro, Tokyo, and Taiseki Kunugi, 7-17-22-903, Roppongi, Minato, Tokyo, both of Japan

Filed Apr. 24, 1974, Ser. No. 463,832
Claims priority, application Japan, Apr. 24, 1973, 48-45673
Int. Cl.² C01B 2/14
U.S. Cl. 48—215 6 Claims



1. A continuous catalytic gasification of heavy oils with recirculated fluidized catalyst bed which comprises the steps of fluidizing heated solid particulate catalyst for the gasification of heavy oils having an average particle size of 0.05 to 2mm with steam to form a first fluidized catalyst bed, passing said heated catalyst through said first bed in a densely fluidized state from the bottom upwardly to the top of said first bed, introducing a heavy oil and steam into said first bed at lower portions thereof, thereby contacting said heavy oil and

said steam with said fluidized catalyst to effect gasification of the oil at a temperature of 650° to 1,000° C, passing the spent catalyst from the top of said first bed to the bottom of a second fluidized catalyst bed which is formed by fluidizing the spent catalyst from said first bed with steam or with a mixture of steam and air, passing said spent catalyst through said second fluidized bed in a densely fluidized state from the bottom upwardly to the top of said second bed, introducing air or a mixture of air and fuel or a hot combustion gas into said second bed, thereby heating said spent catalyst to such a temperature that a temperature within the range between 650° and 1,000° C may be maintained in said first bed and regenerating the catalyst by burning off any carbonaceous material deposited on the spent catalyst, passing said heated and regenerated catalyst from the top of said second bed to the bottom of said first bed for re-use, and withdrawing the gasified product from said first bed.

3,989,482
METHOD FOR THE REMOVAL OF DUST FROM EXHAUST GASES

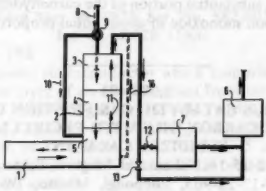
Horst Ritzmann, Neubeckum, Germany, and Johannes Paul Wohlfarth, Mexico City, Mexico, assignors to Polysius AG, Neubeckum, Germany

Continuation of Ser. No. 241,133, April 5, 1972, abandoned. This application Aug. 16, 1974, Ser. No. 497,904

Claims priority, application Germany, June 11, 1971, 2129111

Int. Cl.² B03C 3/01

U.S. Cl. 55—4 **2 Claims**



1. A method of minimizing pollution of the atmosphere by dust contained in furnace exhaust gases used to preheat particulate solid raw material entering a furnace, comprising the steps of passing a stream of particulate solid raw material downward through a heat-exchange path into the furnace, passing a stream of the furnace exhaust gases upward through said heat-exchange path in contact with said stream of material to preheat said material while cooling the exhaust gases, and then passing the cooled exhaust gases through an electrostatic precipitator, the temperature of the exhaust gases entering the precipitator being in the range from 310° t 350° C, wherein the improvement comprises the steps of

a. measuring the dust content of the exhaust gases leaving the precipitator,

b. bypassing around at least a part of said heat exchange path a portion of one of said streams to prevent contact between said stream of particulate solid raw material and said stream of exhaust gases whereby the temperature of the exhaust gases entering the precipitator is raised as compared to the temperature of the gases entering the precipitator in said range, and

c. controlling the amount of the bypassed portion in accordance with said dust content to raise the temperature of the exhaust gases entering the precipitator above said range, thereby appreciably reducing said dust content.

3,989,483
METHOD AND DEVICE FOR SEPARATING GASEOUS OR VAPOROUS MATERIALS, ESPECIALLY ISOTOPES, BY MEANS OF SEPARATION NOZZLES

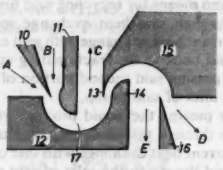
Erwin Willi Becker, Karlsruhe-Durlach; Wolfgang Ehrfeld, Ettlingen, and Gerd Eisenbeiss, Bonn-Holzlar, all of Germany, assignors to Gesellschaft fur Kernforschung m.b.H., Karlsruhe, Germany

Filed July 10, 1974, Ser. No. 487,033

Claims priority, application Germany, Aug. 1, 1973, 2338893

Int. Cl.² B01D 59/00

U.S. Cl. 55—17 **27 Claims**



1. Method of separating gaseous or vaporous substances, especially isotopes, with different molecular weights and/or different gas kinetic cross sections, in which the mixture of substances to be separated and a lighter additional gas are passed through separation nozzles, whereupon one or more skimmer diaphragms projecting into the flow path of said substances are used to separate and remove fractions of different compositions, and in which several separation nozzle systems, each containing a nozzle and skimmer diaphragm, are arranged in a cascade, comprising the step of jointly feeding partial streams generated within the cascade with different fractions of additional gas to one of the separation nozzle systems in such a way as to generate a molar fraction gradient with respect to the additional gas which is opposed in direction to the molar fraction gradient being generated by the separation process within the nozzle, said partial streams comprising a first partial stream and a second partial stream, with said first partial stream having a higher content of additional gas than said second partial stream.

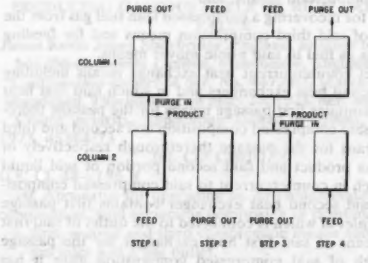
3,989,484
SEPARATION OF ISOTOPES BY CYCLICAL PROCESSES

Charles E. Hamrin, Jr., and Kenny Weaver, both of Lexington, Ky., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 11, 1975, Ser. No. 557,566

Int. Cl.² B01D 53/04

U.S. Cl. 55—58 **5 Claims**



1. A method for separating isotopes of hydrogen mass 1 and deuterium, comprising the steps of:

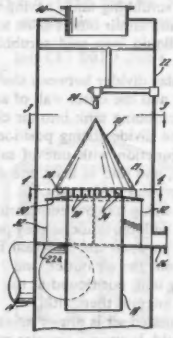
passing a gaseous feed stream containing said isotopes through a first column packed with a palladium sorbent;
removing a product stream enriched in deuterium from said first column;
dividing said product stream into two portions;
directing a first portion of said divided product stream to a second column containing a palladium sorbent and maintained at a lower pressure than said first column to act as a purge stream on said second column;
retaining the second portion of said product stream as a product;
continuing said step of passing for a period of time less than that required to saturate said first column;
switching the roles of said first and second columns by introducing said feed stream into said second column and passing a portion of the product stream from said second column through said first column at a lower pressure than said second column;
continuing said process in a cyclic manner by switching the role of said first and second columns after said period of time; and
maintaining during said step of continuing the volume ratio of the purge stream flow rate to the feed stream flow rate at a value greater than the value at which the degree of enrichment increases on each successive cycle until a constant degree of enrichment is achieved without a decrease in the degree of enrichment in the interim.

3,989,485

PROCESS AND APPARATUS FOR SCRUBBING EXHAUST GAS FROM CYCLONE COLLECTORS

Rodolfo G. Kilian, Mexico City, Mexico, assignor to Intensa, S.A., Mexico City, Mexico

Continuation of Ser. No. 396,831, Sept. 13, 1973, abandoned. This application Feb. 7, 1975, Ser. No. 548,106
Int. Cl.² B01D *47/06*
U.S. Cl. 55—90 **6 Claims**



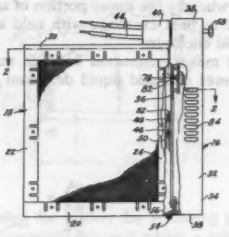
1. The combination comprising a scrubber and a cyclone collector having a vortex finder through which the collected exhaust gas containing fine particles flows vertically in a rapidly swirling vortex, said scrubber comprising the combination of a cylindrical scrubber housing having an inside diameter larger than that of the vortex finder, said scrubber surrounding the exit end of the vortex finder for receiving the vortex as it exits from the finder and allowing the diameter of said vortex to increase, means disposed adjacent the exit end of said vortex finder for substantially preserving the tangential velocity of the particles as the gas passes from the vortex finder into the scrubber housing, spray means disposed adjacent said tangential velocity preservative means for introducing a liquid spray of droplets into the scrubber housing in a manner such as to trap the particles in the exhaust stream in said droplets, the inside walls of said scrubber housing forming an impingement surface for collecting the liquid spray and trapped particles impinging on said surface, drain means cooperating with said scrubber housing for removing from the scrubber the liquid and trapped particles collected on said scrubber housing, exhaust means for discharging the cleansed exhaust stream from the scrubber, and baffle means arranged within said scrubber housing for blocking the entry of said liquid spray into said vortex finder.

3,989,486

ELECTROSTATIC AIR CLEANER WITH AIR FLOW RESPONSIVE SWITCH

Robert L. Baysinger, St. Louis County, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed July 22, 1974, Ser. No. 490,806
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² B03C *3/68*
U.S. Cl. 55—105 **2 Claims**



1. In an electrostatic air cleaner, an electrical power source, an air duct, an ionizing and collector unit in said air duct, an opening in the wall of said duct for the entry and removal of said unit, a casing detachably connected to said duct including a wall portion covering said opening in said duct wall, voltage step-up means and air flow responsive switching means housed in said casing, cooperating contact aperture on said unit and on said casing wall portion providing electrical connections between said voltage step-up means and said unit, an aperture in said casing wall portion, said air flow responsive switching means comprising a controlled solid state switch operative when gated to connect said voltage step-up means across said power source, gating circuit means for said switch including a temperature variable resistor connected across said switch, said resistor being heated by electrical current in the absence of cooling air flow to a temperature at which its resistance prevents gating of said switch, said resistor being mounted in said aperature in said casing wall portion and said casing having an opening in a wall thereof remote from said duct opening to permit induced air flow through said aperture when there is air flow through said duct, and said resistor being cooled sufficiently by a predetermined induced air flow through said aperture to render it ineffective to prevent gating of said switch.

3,989,487

PACKAGED GAS STREAM HYDROCARBON DEWPOINT CONTROL APPARATUS

Adrian J. Peterson, Edmonton, Canada, assignor to Black, Sivalls & Bryson, Inc., Houston, Tex.

Filed Jan. 12, 1976, Ser. No. 648,102
Claims priority, application Canada, Oct. 9, 1975, 237318
Int. Cl.² B01D *19/00*
U.S. Cl. 55—208 **4 Claims**

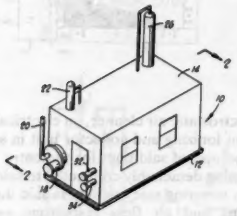
1. Packaged apparatus for controlling the hydrocarbon dewpoint of a gas stream adapted for use in cold environments comprising:

a weather-tight enclosure;

a vapor-liquid contact tower for dehydrating said gas stream by bringing about intimate contact between said gas stream and a liquid desiccant having an affinity for water vapor, said tower having a gas stream inlet connection and a dehydrated gas stream outlet connection and being positioned with respect to said enclosure whereby the lower portion of said tower is disposed within said enclosure and the upper portion of said tower extends outside said enclosure thereby exposing the upper portion of said tower to heat exchange with cold atmospheric air outside said enclosure;

a liquid desiccant reconcentrator including a reboiler having a gas burner attached thereto for providing heat to liquid desiccant contained therein, a still column connected to said reboiler, and a reconcentrated liquid desiccant surge vessel connected to said reboiler, said reconcentrator being positioned within said enclosure whereby heat liberated therefrom heats the interior of said enclosure with said gas burner attached to said reboiler and the upper portion of said still column extending outside said enclosure whereby the upper portion of said still column is exposed to heat exchange with cold atmospheric air outside said enclosure;

first conduit means connected between said vapor-liquid contact tower and said liquid desiccant reconcentrator



for conducting liquid desiccant therebetween in a closed circuit;

pump means disposed in said first conduit means within said enclosure for circulating liquid desiccant between said vapor-liquid contact tower and said reconcentrator;

means for cooling said gas stream and separating condensed hydrocarbon components therefrom to thereby produce a residue gas stream having a desired hydrocarbon dewpoint, said means being disposed within said enclosure whereby heat liberated by said means heats the interior of said enclosure, and having a dehydrated gas stream inlet connection and a residue gas stream outlet connection;

second conduit means connected between said dehydrated gas stream outlet connection of said vapor-liquid contact tower and said dehydrated gas stream inlet connection of said means for cooling said gas stream and separating condensed components therefrom for conducting said gas stream therebetween;

third conduit means connected to said residue gas outlet connection of said means for cooling said gas stream and separating condensed components therefrom for conducting said residue gas stream to a pipeline; and

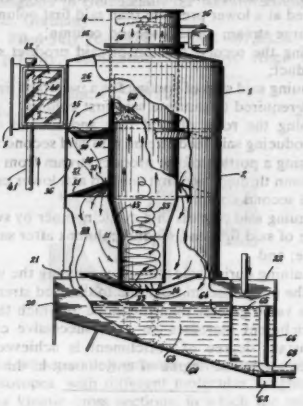
a skid upon which said enclosure, said vapor-liquid contact tower, said liquid desiccant reconcentrator, said pump means, said means for cooling said gas stream and separating condensed components therefrom and said conduit means are mounted.

3,989,488

MULTI-STAGE AIR SCRUBBING UNIT

Walter L. Wisting, 5 Oakdale Road, Branford, Conn. 06405

Filed Mar. 17, 1975, Ser. No. 558,887
Int. Cl.² B01D 47/06, 47/12
U.S. Cl. 55—238 19 Claims



1. An air scrubber adapted to remove contaminants from air through use of multiple cleaning stages including;

a vertically-positioned cylindrical scrubbing tank,

an air inlet means at the upper end thereof, positioned to direct incoming air for circular motion within said tank,

a generally cylindrical air outlet tube positioned within said scrubbing tank, coaxial therewith, and running the length of said scrubbing tank, said outlet tube being integral with the top of said scrubbing tank, having an air entrance at its lower end, and an air outlet at its top end,

means to spray liquid into said scrubbing tank air inlet means,

at least one circular divider between the inner wall of said scrubbing tank and the outer wall of said air outlet tube dividing said scrubbing tank into air cleaning chambers, said at least one divider being positioned at an angle to define, in conjunction with one of said walls, a liquid-holding trough, and said at least one divider defining an annular gap between said stages,

said annular gap being narrow enough to compress the air into admixture with the liquid as they pass therethrough,

a fan positioned to draw air into said inlet, through said scrubber, and out the air outlet, and

a liquid receiving tank positioned at the base of the scrubbing tank and integral therewith,

whereby contaminated air is drawn into said inlet means, is mixed with liquid, is given a circular motion and is scrubbed in at least two chambers, and removed from said unit through said air outlet.

3,989,489

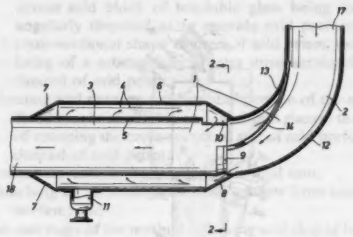
CENTRIFUGAL APPARATUS FOR GAS/LIQUID SEPARATION

Willem C. Van't Sant, and Alfred L. Van Kleef, both of The Hague, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 4, 1975, Ser. No. 601,964
Int. Cl.² B01D 45/12
U.S. Cl. 55—338 3 Claims

1. A gas/liquid separator comprising a substantially horizontal tubular conduit forming a fluid channel having a curved fluid entry portion, a concentric tubular member surrounding and in spaced relationship to an elongated portion of said

horizontal tubular conduit forming an elongated annular liquid collecting and separation chamber with means closing the ends of said annular chamber, a liquid outlet forming port means in communication between the tubular fluid channel and the liquid collecting chamber near the downstream end of said curved portion, a liquid discharge secured to the liquid collecting chamber, and a gas discharge port in communication between the upper portion of the annular liquid collecting chamber and the upper portion of the tubular fluid channel at the upstream end thereof, the gas discharge port being arranged near the downstream end of the curved part, and at least one gutter extending along the inner surface of the wall of the curved part of the tubular fluid channel, said gutter beginning near the inner wall of the curved part and debouching into the liquid outlet for directing liquid to said outlet.



3,989,490

OIL SEPARATOR, ESPECIALLY FOR A COOLING MEDIUM COMPRESSOR

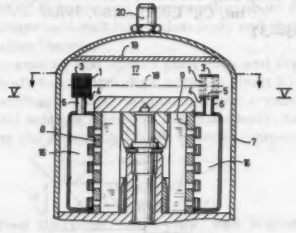
Gerhard Adalbert, Markgronengen; Hubert Dettling, Hohenacker, and Jürgen Hess, Baden-Baden, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 7, 1974, Ser. No. 512,656

Claims priority, application Germany, Oct. 5, 1973, 2350015

Int. Cl.² B01D *29/04*

U.S. Cl. 55—385 C **6 Claims**



1. In combination with a compressor having exhaust outlet means through which the compressor during operation thereof expels a gas-oil mixture containing oil droplets, a pair of oil separators, casing means surrounding said separators and forming a closed chamber thereabout, said casing means also having vent means, each oil separator comprising a hollow cylindrical coagulator formed of a plurality of layers of wire fabric, each oil separator including two end plates closing off the opposite axial ends of the respective cylindrical coagulator, one end plate of each oil separator being provided with an inlet opening connected to the exhaust outlet means of the compressor for admitting the gas-oil mixture expelled from the exhaust outlet means into the interior of the hollow cylindrical coagulator to be expelled radially outward through the wire fabric of the hollow cylindrical coagulator, the cylindrical coagulators being disposed spaced from each other with the longitudinal axes of the coagulators being generally parallel and the axial ends of one coagulator being lined up with the axial ends of the other coagulator, the separators are spaced such that as gas-oil mixture is expelled from the two oil separators oil droplets in the gas-oil mixture expelled from the two separators will collide with each other in a zone intermediate the two separators and form a wall of foaming oil.

3,989,491

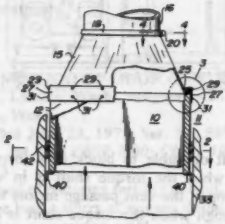
GAS FILTER AND MOUNTING

Michael E. Pelosi, Jr., and Raymond Fink, both of c/o Airo Clean Engineering, Inc., 520 Abbott Drive, Broomall, Pa. 19008

Filed Aug. 18, 1975, Ser. No. 605,521

Int. Cl.² B01D *46/00*

U.S. Cl. 55—502 **5 Claims**



1. In a mounting for a filter for removing particles from gaseous fluids removably mounted within a cabinet in which the cabinet has enclosing walls with horizontal filter supporting rails therein and fluid inlet and outlet connections and the filter has a rigid surrounding frame and exposed upper and lower horizontal faces the improvement which comprises

a flexible transition duct member connected to said rigid frame contiguous to one of said horizontal faces and to one of said fluid connections, and

a peripherally disposed gasket member on said rigid frame intermediate the top and bottom thereof for fluid tight engagement with the interiors of said enclosing walls,

said filter having the lower horizontal face in supported relation to said filter supporting rails,

said filter having the other of said horizontal faces in communication with the other of said fluid connections.

3,989,492

DISPENSING MACHINE

Richard M. Keyes, Rockford, Ill., assignor to Beatrice Foods Co., Chicago, Ill.

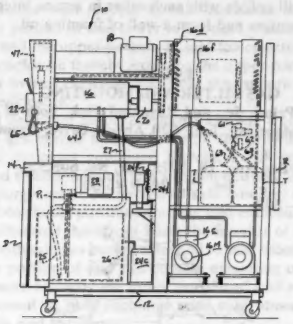
Division of Ser. No. 504,525, Sept. 9, 1974. This application June 20, 1975, Ser. No. 588,607

Int. Cl.² A23G *9/04*

U.S. Cl. 62—136 **8 Claims**

1. In a machine for making and dispensing an aerated semi-frozen comestible including an elongated generally horizontal freezing compartment having an outlet end and adapted to freeze a liquid comestible, a valve block at the outlet end of the freezing compartment and having a dispensing valve therein and a shaft passage extending therethrough, a reservoir for holding a liquid comestible, feed means for supplying the liquid comestible and a gas to the freezing compartment, rotary means in the freezing compartment adapted to rotatably stir the comestible therein, a viscosity sensing member in said freezing compartment having a torque transmitting shaft extending out of the freezing compartment through said shaft passage in the valve block, and manually operable vent means for venting excess gas from the freezing compartment upon start-up, the improvement wherein said torque transmitting shaft on the viscosity sensing member is mounted for sliding

movement in the shaft passage between a first axial position and a second axial position, said vent means includes vent passage means in said valve block for venting gas from said freezing compartment to the atmosphere, and seal means on



said torque shaft operable to block flow through said vent passage means when the torque shaft is in said first axial position and to open the vent passage means for the passage of gas therethrough when the torque shaft is in said second axial position.

3,989,493

METHODS FOR MAKING A FIBER OPTIC DISPLAY DEVICE

Colin Barron, and Stephen John Turpin, both of Leeds, England, assignors to The Rank Organisation Limited, London, England

Filed Feb. 26, 1974, Ser. No. 446,100

Claims priority, application United Kingdom, Feb. 26, 1973, 9363/73

Int. Cl.² G03B *37/00*

U.S. Cl. 65—2 **3 Claims**

1. A method of producing a display device from a sheathed fibre optic bundle, which method comprises the following steps:

stripping the sheath from the fibres in a portion of said bundle extending from one end thereof,

twisting the fibres in said stripped portion together,

bending the twisted fibres in said stripped portion at a point adjacent the remaining sheathed portion over an element heated sufficiently to give the fibres a permanent set bend after removal of said element, and

giving said fibres a jolting movement to untwist them, whereby to cause the fibres to radiate from the end of the bundle substantially in a single plane, so as to form a rosette.

3,989,494

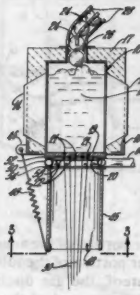
METHOD FOR MAKING GLASS FIBERS

Folsom Munro Veazie, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 468,117, May 8, 1974, abandoned. This application May 27, 1975, Ser. No. 580,996

Int. Cl.² C03B *37/02*

U.S. Cl. 65—2 **2 Claims**



1. The method of controlling heat-softened glass in a fiber forming process including flowing streams of the glass from orifices in a stream feeder, feeding a mixture of hydrocarbon gas and air adjacent the stream flow surface region of the feeder wherein the amount of air in the mixture is insufficient to attain complete combustion of the hydrocarbon gas, and effecting incomplete combustion of the hydrocarbon gas at the stream flow region providing a luminous flame yielding particles of carbon deposited on the stream flow surface of the feeder wherein the carbon promotes separation of the heat-softened glass from the stream flow surface of the feeder.

3,989,495

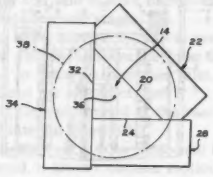
METHOD OF MAKING OPTICAL PRISMS

Walter P. Siegmund, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Filed July 10, 1975, Ser. No. 594,825

Int. Cl.² C03C *15/00, 19/00*

U.S. Cl. 65—31 **5 Claims**



1. The method of making a miniature optical prism comprising the steps of:

preparing from a block of insoluble glass a prism preform by grinding and polishing a first flat optical surface on one side of said block;

fusing a first block of a leachable glass to said first optical surface, said first block of leachable glass extending completely across said first optical surface;

grinding and polishing a second flat optical surface on another side of said block of insoluble glass and through a portion of said first block of leachable glass;

fusing a second block of leachable glass to said second flat optical surface, said second leachable block extending completely across said second surface including said portion of said first block of leachable glass;

grinding and polishing a third flat optical surface on still another side of said block of insoluble glass and through portions of both said first and second blocks of said leachable glasses;

fusing a third block of leachable glass to said third optical surface, said third leachable block extending completely across said third surface including said portions of said first and second blocks of leachable glass, portions of said first, second and third flat optical surfaces extending across said block of insoluble glass being so relatively angularly disposed as to provide said preform with the cross-sectional shape desired of said prism, said preform being of a substantially greater cross-sectional size than desired of said prism;

heating and drawing a substantial portion of the unit of said fused blocks of soluble and insoluble glasses to the extent of reducing the cross-sectional size of said preform to that desired of said prism;

removing said drawn portion from said unit;

leaching all remaining leachable glasses from said removed portion; and

at one stage of the method following said step of heating and drawing, cutting said drawn portion of said preform transaxially to the length desired of said prism.

3,989,496

SPONTANEOUSLY-FORMED GLASS-CERAMICS CONTAINING BARIUM AND/OR STRONTIUM IRON SILICATE CRYSTALS

Hermann L. Rittler, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Mar. 19, 1975, Ser. No. 559,731

Int. Cl.² C03B *32/00*; C03C *3/22*

U.S. Cl. 65—33 **5 Claims**

1. A method for making a highly crystalline glass-ceramic article consisting essentially of BaO and/or SrO-Fe_2O_3-SiO_2 solid solution crystals with, optionally, Fe_3O_4 dispersed within a glassy matrix, said crystals comprising at least 50% by volume of said article, which comprises the steps of:

a. melting a batch for a glass consisting essentially, by weight on the oxide basis, of about 8–20% BaO and/or 15–25% SrO, the total BaO + SrO not exceeding about 25%, 20–40% Fe_2O_3, and 40–70% SiO_2;

b. simultaneously cooling said melt at a rate between about 10°–1000° C./minute to a temperature about 850°–1050° C. to shape said melt into a glass body and obtain a phase separation therein;

c. further cooling said shaped glass body and exposing said glass body to a temperature between about 650°–850° C. for a sufficient length of time to cause crystallization of the solid solution phases in said glass body; and then

d. cooling the crystallized body to room temperature.

3,989,497

GLASS MELTING

George Alfred Dickinson, Merseyside, and William Jackson Rhodes, Prescot, both of England, assignors to Pilkington Brothers Limited, Merseyside, England

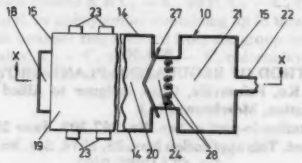
Filed Apr. 25, 1975, Ser. No. 571,823

Claims priority, application United Kingdom, Apr. 26, 1974, 18457/74

Int. Cl.² C03B *5/18*

U.S. Cl. 65—135 **11 Claims**

9. A method of producing molten glass comprising the steps of: feeding glass forming material to one end of a glass melting tank, melting the material in a melting zone of the tank, refining the molten glass in a refining region before the glass passes to a conditioning zone at a working end of the tank from which molten glass is discharged from the tank, said method further including the steps of controlling the forward flow of molten material from the refining zone to the conditioning zone by use of a substantially horizontal barrier through which cooling liquid is passed in the upper region of the melt, and stirring the melt in the waist region by rotation of at least two stirrers about substantially vertical axes, the stirrers being mounted side-by-side across the direction of glass flow and



rotated so that there is no vertical motion imparted to said flow and at, at least, one position in each revolution of the stirrers there is no angular difference between the rotational settings of the stirrers.

3,989,498

METHOD OF ODOR CONTROL

James P. Cox, Lynden, Wash., assignor to H. Gordon Walker, Bellingham, Wash.

Filed June 23, 1975, Ser. No. 589,074

Int. Cl.² C05F *7/00*; C05G *3/04*

U.S. Cl. 71—3 **6 Claims**

1. The method of restoring fertility to land, which comprises applying to the land a slurry of sewage sludge and the deodorant composition comprising amyl alcohol and glacial acetic acid.

3,989,499

CONVERSION OF REFUSE INTO FIBROUS MATERIAL

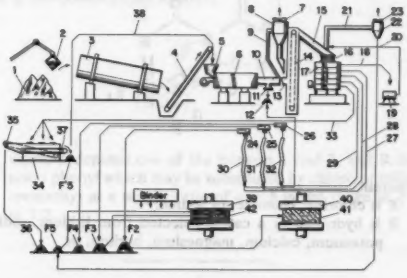
Raimund Jetzer, Nussbaumen, Switzerland, assignor to Jetzer Engineering AG, Vaduz, Liechtenstein

Continuation-in-part of Ser. No. 7,996, Feb. 2, 1970, abandoned. This application Jan. 26, 1973, Ser. No. 327,234

Claims priority, application Switzerland, May 17, 1972, 7355/72

Int. Cl.² C05F *11/08*

U.S. Cl. 71—9 **5 Claims**



1. A method of producing a fibrous material from household, agricultural, forestry and/or commercial refuse containing a mix of substances which, respectively, have a more rapid decomposition rate substantially equal to that of sugar, proteins and starches, a less rapid decomposition rate substantially equal to that of cellulose, and a slower decomposition rate substantially equal to that of lignin, said method comprising the steps of subjecting said refuse to aerobic decomposition; interrupting said aerobic decomposition after substantially only the substances having said more rapid decomposition rate are decomposed so as to obtain a fibrous material;

and drying said fibrous material, whereby to obtain a product having relatively straight and long fibers.

3,989,500

METHOD OF REGULATING PLANT GROWTH

Han San Ku, Painesville, Ohio, assignor to Allied Chemical Corporation, Morristown, N.J.

Continuation-in-part of Ser. No. 267,309, June 29, 1972, abandoned. This application Nov. 25, 1974, Ser. No. 526,753
Int. Cl.² C05C 9/00
U.S. Cl. 71—28 12 Claims

1. A method for improving the yield of plants comprising applying to the plant an effecitve amount of a compound selected from the group consisting of substituted thioureas having the formula:

R—NH—CS—NHR'

where R and R' are the same or different, and are aliphatic hydrocarbon of 1 to 12 carbon atoms and aromatic hydrocarbon up to 12 carbon atoms.

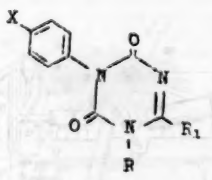
3,989,501

METHODS FOR INCREASING RICE CROP YIELDS

Henry Kuratle, III, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 6, 1975, Ser. No. 555,997
Int. Cl.² A01N 21/02
U.S. Cl. 71—77 19 Claims

1. A method for increasing the yield of rice crops which comprises applying an effective amount of an s-triazinedione to rice seeds, seedlings, or to soil in which rice seeds or seedlings are planted, not later than 80 days after planting, the s-triazinedione being a compound of the formula

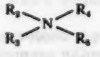


I

wherein

X is chlorine, bromine, or iodine;

R is hydrogen or a cation selected from lithium, sodium, potassium, calcium, magnesium, barium, or



where

R_2, R_3, and R_4 can be the same or different and each can be hydrogen, alkyl of 1 through 4 carbon atoms, or hydroxy alkyl of 2 through 4 carbon atoms; and R_5 is hydrogen, alkyl of 1 through 12 carbon atoms, or benzyl; R_2 and R_3 can be taken together to form a ring that is $-(CH_2)_2-O-(CH_2)_2-$ or $-(CH_2)_n-$ where n is 4 through 6 and R_4 and R_5 are hydrogen; and

R_1 is SR_6 or OR_6 where R_6 is methyl or ethyl.

3,989,502

METHOD FOR CONTROLLING GROWTH OF TOBACCO SUCKERS

Ryuzo Nishiyama, Takatsuki; Ryohei Takahashi, and Nobuyuki Sakashita, both of Kusatsu, all of Japan, assignors to Sumitomo Chemical Company, Limited and Ishihara Sangyo Kaisha Ltd., both of Osaka, Japan

Filed Oct. 22, 1974, Ser. No. 517,000
Claims priority, application Japan, Oct. 27, 1973, 48-121032
Int. Cl.² A01N 9/36
U.S. Cl. 71—78 7 Claims

1. A method for controlling tobacco suckers characterized by applying around portions of the tobacco in which suckers are to be developed or have been slightly developed a composition comprising as the active ingredient 100 to 10,000 ppm of a compound selected from the group consisting of O-ethyl-O-(2-nitro-5-methylphenyl)-N-sec-butyl-phosphorothionoamidate, O-ethyl-O-(2-nitro-5-methylphenyl)-N-ethyl-phosphorothionoamidate, O-ethyl-O-(2-nitro-5-methylphenyl)-N-n-propylphosphorothionoamidate, O-methyl-O-(2-nitro-5-methylphenyl)-N-n-butylphosphorothionoamidate, O-methyl-O-(2-nitro-5-methylphenyl)-N-isobutylphosphorothionoamidate, O-methyl-O-(2-nitro-5-methylphenyl)-N-sec-butylphosphorothionoamidate, O-n-propyl-O-(2-nitro-5-methylphenyl)-N-isopropylphosphorothionoamidate, O-n-butyl-O-(2-nitro-5-methylphenyl)-N-isopropylphosphorothionoamidate, O-ethyl-O-(2-nitro-5-methoxyphenyl)-N-sec-butylphosphorothionoamidate, O-methyl-O-(2-nitro-4-methylphenyl)-N-sec-butylphosphorothionoamidate, O-methyl-O-(2-nitro-4-chlorophenyl)-N-sec-butylphosphorothionoamidate, O-methyl-O-(2-nitrophenyl)-N-sec-butylphosphorothionoamidate, O-ethyl-O-(2-nitro-4,5-dimethylphenyl)-N-isopropylphosphorothionoamidate, O-ethyl-O-(2-nitro-4,5-dimethylphenyl)-N-sec-butylphosphorothionoamidate, O-ethyl-O-(2-nitro-3,5-dimethylphenyl)-N-sec-butylphosphorothionoamidate, O-methyl-O-(2-nitro-4,5-dimethylphenyl)-N-sec-butylphosphorothionoamidate, and O-methyl-O-(2-nitro-3,5-dimethylphenyl)-N-sec-butylphosphorothionoamidate, wherein the composition is applied in a proportion of 10 to 100 ml per tobacco plant.

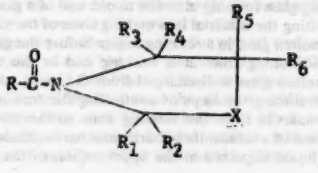
3,989,503

HERBICIDAL ANTIDOTE COMPOSITIONS WITH SUBSTITUTED OXAZOLIDINES AND THIAZOLIDINES

Ferenc M. Pallos, Walnut Creek, Calif.; Mervin E. Brokke, Stamford, Conn., and Duane R. Arneklev, Antelope, Mont., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 297,561, Oct. 13, 1972, abandoned, which is a continuation-in-part of Ser. No. 208,041, Dec. 9, 1971, which is a continuation-in-part of Ser. No. 134,868, April 16, 1971, abandoned. This application May 2, 1973, Ser. No. 356,547
Int. Cl.² A01N 9/22, 9/24
U.S. Cl. 71—88 67 Claims

1. An herbicidal composition comprising an active thiocarbamate herbicidal compound and an antidote therefor corresponding to the formula



in which X is oxygen or sulfur, R is haloalkyl having 1 to 10 carbon atoms, inclusive, and the term halo includes chloro and bromo substitutions, alkyl having 1 to 10 carbon atoms, inclusive, or alkylthio having 1 to 4 carbon atoms, inclusive; R_1, R_2, R_3, R_4, R_5 and R_6 are independently selected from the group consisting of hydrogen, lower alkyl having 1 to 4 carbon atoms, inclusive, alkoxyalkyl having a total of 2 to 4 carbon atoms, inclusive, and lower alkylol having 1 to 4 carbon atoms, inclusive.

3,989,504

HERBICIDAL COMPOSITION OF 3,4-DIHYDRO-2H-PYRANE-2,4-DIONES AND METHODS

Mikio Sawaki; Isao Iwataki, both of Odawara; Yoshihiko Hirono, Hiratsuka; Hisao Ishikawa, Oiso; Shozo Yamada, Hiratsuka; Yasushi Yasuda, Hiratsuka, and Mitsuo Asada, Hiratsuka, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

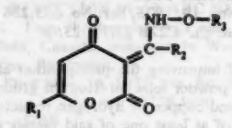
Division of Ser. No. 406,621, Oct. 15, 1973, Pat. No. 3,927,034. This application July 3, 1975, Ser. No. 592,911

Claims priority, application Japan, Oct. 20, 1972, 47-104962; Dec. 25, 1972, 48-2526; Dec. 25, 1972, 48-2527

Int. Cl.² A01N 9/00

U.S. Cl. 71—88 18 Claims

1. A herbicidal composition comprising a herbicidally effective amount of a compound of the formula



wherein R_1 is alkyl of 2 to 3 carbon atoms,

R_2 is alkyl of 2 to 3 carbon atoms and

R_3 is selected from the group consisting of ethyl and allyl.

3,989,505

USE OF POLYCYCLIC THIOPHENE COMPOUNDS AS RIPENERS FOR SUGARCANE

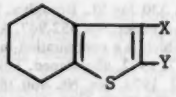
Louis G. Nickell, Honolulu, Hawaii, assignor to Hawaiian Sugar Planters' Association, Honolulu, Hawaii

Filed June 23, 1975, Ser. No. 589,400

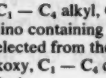
Int. Cl.² A01N 5/00

U.S. Cl. 71—90 11 Claims

1. A process for modifying the ripening of maturing sugarcane plants which comprises applying to the cane plants at a time from 2 to 10 weeks prior to harvest a sucrose increasing amount of a ripening agent of the formula



wherein X is cyano, carboethoxy or carbamido; Z is oxygen or sulfur; and Y is an amino radical $-NH_2$ or a radical having the formula



and in which radical R is $C_1 - C_4$ alkyl, $C_1 - C_4$ chlorinated alkyl, 2-furyl, or phenylamino containing up to three substituents on the benzene ring selected from the group consisting of $C_1 - C_4$ alkyl, $C_1 - C_4$ alkoxy, $C_1 - C_4$ chloroalkyl, $C_1 - C_4$ fluoroalkyl, fluorine or chlorine.

3,989,506

HERBICIDE MIXTURES

Caecilia Emma Fischer, Mutterstadt, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation-in-part of Ser. No. 432,676, Jan. 11, 1974, abandoned, which is a division of Ser. No. 343,629, March 22, 1973, Pat. No. 3,888,655. This application Apr. 17, 1975, Ser. No. 569,057

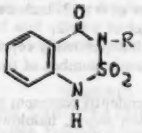
Claims priority, application Germany, Apr. 13, 1972, 2217722

Int. Cl.² A01N 9/12

U.S. Cl. 71—91 6 Claims

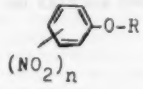
1. A herbicide composition consisting essentially of an inert carrier having dispersed therein a herbicidally effective amount of a mixture of

a. a compound of the formula



wherein R denotes lower alkyl of a maximum of 4 carbon atoms, or the alkali metal, alkaline earth metal, ammonium, lower hydroxylalkyl ammonium or lower alkyl ammonium salt thereof, and

b. a compound of the formula



where *n* denotes one of the integers 1 and 2, and R denotes phenyl which may be substituted by chloro or trifluoromethyl at a weight ratio of *a* to *b* in the range of 2:1 to 1:2.

3,989,507

1H-PYRIDO(2,3-C OR 4,3-C) (1,2,6)THIADIAZIN-4(3H)-ONE-2,2-DIOXIDES AND DERIVATIVES THEREOF

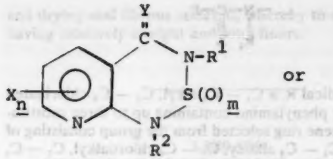
Lennon H. McKendry, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 412,944, Nov. 5, 1973, Pat. No. 3,920,641. This application Apr. 28, 1975, Ser. No. 572,023

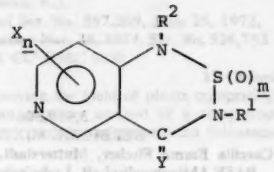
Int. Cl.² A01N 9/12

U.S. Cl. 71—91 20 Claims

1. A composition comprising a herbicidally effective amount of a compound of the formulae:



or



wherein

each X independently represents loweralkyl of 1 to 6 carbon atoms, haloloweralkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, $-SO_2R^5$, $-SO_2$ aryl wherein aryl is phenyl, halophenyl or tolyl, $Y'R^5$, CCl_3, CF_3, SCN,

aryl wherein aryl is phenyl, halophenyl or tolyl, aryloxy wherein aryl is phenyl, halophenyl or tolyl, $-NR^3R^4$, halo, nitro, $-SO_2NR^3R^4$, $-COOR^5$ or $Y''CF_2CZ_3$;

n represents an integer of 0 to 3, inclusive;

m represents an integer of 1 or 2;

each Y, Y'' and Y''' independently represent a chalcogen group having an atomic number of from 8 to 16, inclusive;

R^1 and R^2 each independently represent hydrogen, loweralkyl of 1 to 6 carbon atoms, haloloweralkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms, haloalkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, haloalkynl of 3 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, aryl wherein aryl is phenyl, halophenyl or tolyl, benzyl, benzoyl, benzenesulfonyl, loweralkoxyalkyl wherein each of alkoxy and alkyl are from 1 to 6 carbon atoms, $Y'R^5$, $-SCCl_3$,

NH_2, $-SO_2R^5$,

dialkylaminoalkyl wherein each alkyl is of from 1 to 6 carbon atoms, pyrrolidinoethyl, piperidinoethyl, morpholinoethyl,

or $-C(CH_3)_2C \equiv N$;

each R^3 and R^4 independently represent hydrogen or loweralkyl of 1 to 6 carbon atoms;

each R^5 represents loweralkyl of 1 to 6 carbon atoms;

each Z independently represents hydrogen, bromo, chloro or fluoro; and

where at least one of R^1 and R^2 is hydrogen, the salts thereof with organic or inorganic bases,

and an inert carrier therefor.

3,989,508

SUBSTITUTED NITROANILINES AND UREAS AS HERBICIDAL MIXTURES

Adolf Fischer, Mutterstadt, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation-in-part of Ser. No. 297,270, Oct. 13, 1972, abandoned, which is a division of Ser. No. 162,317, July 13, 1971, Pat. No. 3,849,107. This application May 9, 1974, Ser. No. 468,372

Claims priority, application Germany, Jan. 28, 1970, 2037265

Int. Cl.² A01N 9/20

U.S. Cl. 71—120 **7 Claims**

1. A herbicide composition an inert carrier containing a herbicidally effective amount of a mixture consisting essentially of

a. N-propyl-N-β-chloroethyl-2,6-dinitro-4-trifluoromethylaniline and

b. a member selected from the group consisting of N-3,4-dichlorophenyl-N′,N′-dimethylurea, N-3,4-dichlorophenyl-N′-methyl-N′-methoxyurea, N-(3-chloro-4-methylphenyl)-N′,N′-dimethylurea, N-(3-trifluoromethylphenyl)-N′,N′-dimethylurea, N-(3-chloro-4-methoxyphenyl)-N′,N′-dimethylurea, and N-(3-chloro-4-methoxyphenyl)-N′-methyl-N′-methoxyurea in a weight ratio of *a* to *b* in the range of 3:1 to 1:3.

3,989,509

CATALYTIC HYDROGEN REDUCTION OF METALS FROM SOLUTIONS

Eddie C. Chou, Arvada, Colo.; Ranko P. Crnojevich, Gretna, La., and Harold Koehler, Fort Madison, Iowa, assignors to Amax Inc., Greenwich, Conn.

Filed Nov. 19, 1975, Ser. No. 633,236

Int. Cl.² C22B 15/12, 23/04

U.S. Cl. 75—.5 A **15 Claims**

1. A method of improving the precipitation efficiency of non-ferrous metal powder selected from the group consisting of nickel, cobalt and copper by hydrogen reduction from an aqueous solution of at least one of said metals which comprises,

providing said aqueous solution with a small but effective amount of a catalytic agent in an autoclave sufficient to avoid agglomeration of precipitated metal powder while substantially preventing the plating out of said metal on parts of said autoclave in contact with said solution,

said catalytic agent comprising an organic salt selected from the group consisting of alkali metal and ammonium salts of a copolymer of maleic acid anhydride and a branched chain aliphatic olefinic hydrocarbon of 4 to 10 carbon atoms,

and then subjecting said solution to reduction with sulfur-free hydrogen under elevated temperature and pressure while continuously agitating said solution and thereby produce a sulfur-free metal powder at an overall reduction efficiency of over 96% while substantially avoiding agglomeration of said metal powder and plating out of said reduced metal on autoclave parts in contact with said solution.

3,989,510

MANUFACTURE OF TITANIUM CHLORIDE AND METALLIC IRON FROM TITANIFEROUS MATERIALS CONTAINING IRON OXIDES

Donald F. Othmer, 330 Jay St., Brooklyn, N.Y. 11201

Continuation-in-part of Ser. No. 352,947, April 20, 1973, Pat. No. 3,859,077, which is a continuation-in-part of Ser. No. 235,531, March 17, 1972, abandoned. This application Apr. 12, 1974, Ser. No. 460,383

Int. Cl.² C22B 1/00, 5/10, 5/16

U.S. Cl. 75—1 T **38 Claims**

1. A process conducted at approximately one atmosphere pressure for making metallic iron in a dense phase from an

original material containing titanium oxide and at least one iron oxide comprising:

a. reacting chemically while heating to a maximum temperature between 1535° and 1950° C, said original material with silica, a solid reductant, and a halide of a third metal chosen from the alkaline and alkaline earth metals; said halide being present in at least a sufficient amount to supply the halogen necessary to produce the tetrahalide of all of the titanium present in said original material; and said silica being present in at least a sufficient amount which, when added to that present in said original material, will combine with all of said third metal in said halide;

b. producing by chemical reaction:

i. a dense phase containing iron from said iron oxide;

ii. a gaseous phase containing titanium tetrahalide from said titanium oxide;

iii. a liquid phase flux comprising a silicate of said third-metal chosen from the alkaline and alkaline earth metals and said silica, and containing some solid impurities coming from at least one of the following: said original material, said silica, said solid reductant, and said third-metal halide;

c. removing from said reaction zone and separating from each other said dense phase containing iron, said gas phase containing said titanium tetra-halide, and said liquid phase flux; and

d. refining said gas phase to obtain titanium tetra-halide in usable form.

3,989,511

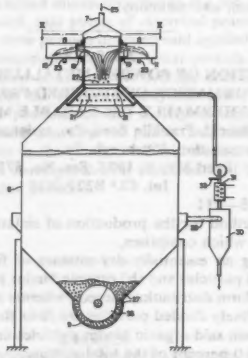
METAL POWDER PRODUCTION BY DIRECT REDUCTION IN AN ARC HEATER

Maurice G. Fey, Pittsburgh, Pa., and Edna A. Dancy, Beaconsfield, Canada, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 10, 1975, Ser. No. 557,155

Int. Cl.² B22F *9/00*

U.S. Cl. 75—.5 BB **1 Claim**



1. A process for producing metal powder by direct reduction of an ore, comprising the steps of introducing a finely divided ore consisting essentially of an oxide of the metal into an arc-heated plasma gas to effect direct reduction of the oxide to small elemental solid metal particles, the elemental metal having a melting temperature greater than the temperature of the chemical reduction reaction, and cooling the reduced elemental metal particles by cooling the gas as it flows through an expansion nozzle.

3,989,512

PLASMA HEAT TREATMENT MEANS AND METHOD

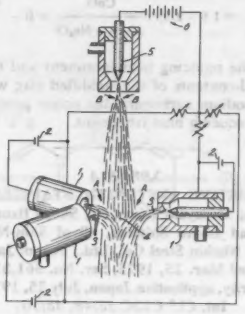
Ian George Sayce, Hampton, England, assignor to National Research Development Corporation, London, England

Filed June 4, 1975, Ser. No. 583,688

Claims priority, application United Kingdom, June 7, 1974, 25415/74

Int. Cl.² C21C *5/52*; H05B *7/18*

U.S. Cl. 75—11 **27 Claims**



1. A heater assembly comprising cathodic plasma generating means for generating a column of plasma, a plurality of anodic plasma torches the outlets of which are symmetrically disposed about the axis of the column and circuit means for energising said generating means and said torches, the arrangement being such that in operation a current is passed simultaneously between the generating means and each of the torches by way of said column and jets of plasma from said outlets which merge with said column.

3,989,513

METHOD FOR THE TREATMENT OF RED MUD

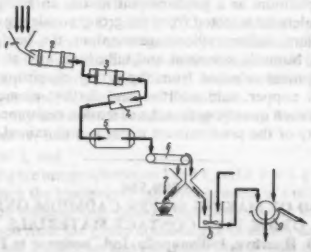
György Dobos; Zoltán Felföldi; Gyula Horváth, all of Budapest; György Kaptay, Almasfuzito; Zoltán Osvald, and Károly Solymár, both of Budapest, all of Hungary, assignors to Magyar Aluminiumipari Troszt, Budapest, Hungary

Continuation of Ser. No. 366,697, June 4, 1973, abandoned. This application Mar. 11, 1975, Ser. No. 557,341

Claims priority, application Hungary, June 6, 1972, MA 2364

Int. Cl.² C21B *5/04*

U.S. Cl. 75—30 **7 Claims**



1. In a method for the treatment of the red mud byproduct of aluminum manufacture said red mud containing Fe_2O_3, Al_2O_3, Na_2O, SiO_2 and TiO_2, wherein the red mud is subjected to a reducing heat treatment with an added reducing agent during the course of which said red mud is molten, the iron and slag that are formed are separated from each other, and subsequently leaching out the Na and Al contents of the solidified slag, the improvement in combination therewith compris-

ing adding to the red mud which contains more than 5% Na_2O a CaO-containing ingredient in the following molar ratios and based on the weight of dry red mud

$$\frac{CaO}{SiO_2} = 1.8 - 2.2; \quad \frac{CaO}{TiO_2} = 0.9 - 1.1$$

$$\frac{CaO}{Fe_2O_3} = 1.8 - 2.2; \quad \frac{CaO}{Al_2O_3 - Na_2O} = 0 - \frac{12}{7}$$

carrying out the reducing heat treatment and then leaching the Na and Al-contents of the solidified slag with a caustic solution and sodium carbonate, the entire process requiring only a single reducing heat treatment.

3,989,514

HEAT-RESISTING AUSTENITIC STAINLESS STEEL

Tokio Fujioka; Masayuki Kinugasa; Shozo Iizumi; Shizuhiro Teshima, and Isamu Shimizu, all of Shin-Nanyo, Japan, assignors to Nisshin Steel Co., Ltd., Tokyo, Japan

Filed Mar. 25, 1975, Ser. No. 561,813
Claims priority, application Japan, July 25, 1974, 49-84622
Int. Cl.² C22C *38/48, 38/50*
U.S. Cl. 75—124 **3 Claims**

1. A heat-resisting austenitic stainless steel consisting essentially of not more than 0.15% by weight of C, 1.5 – 4.0% by weight of Si, not more than 2% by weight of Mn, 17.0 – 30.0% by weight of Ni, 24.0 – 32.0% by weight of Cr, 0.5 – 2.5% by weight of Al, 0.001 – 0.100% by weight of Ca, 0.001 – 0.100% by weight of at least one rare earth metal, 0 – 1.0% by weight of at least one of Ti, Zr, Hf, Nb and Ta and balance Fe and incidental impurities.

3,989,515

ALLOYS FOR TENSION BANDS

Karl H. Reiff, Belm, Germany, assignor to Carl Haas, Schramberg, Germany

Continuation-in-part of Ser. No. 33,007, Feb. 9, 1973, Pat. No. 3,907,556. This application June 9, 1975, Ser. No. 585,442
Claims priority, application Germany, Feb. 11, 1972, 2206397
Int. Cl.² C22C *5/04*
U.S. Cl. 75—172 R **19 Claims**

1. In a method of operating a measuring instrument having a rotatable meter mechanism and a taut strip, the improvement comprising providing as the taut strip, a low modulus of torsion, high quality factor alloy consisting essentially of palladium or platinum as a predominant metal, an additive of at least one element selected from the group consisting of aluminum, gallium, indium, silicon, germanium, tin, lead, arsenic, antimony, bismuth, selenium and tellurium, and at least one further element selected from the group consisting of gold, silver and copper, said additive and further element being present in such quantities that the corrosion resistance and the workability of the predominant metal is maintained.

3,989,516

METHOD OF MAKING SILVER-CADMIUM OXIDE-TIN OXIDE TYPE CONTACT MATERIALS

Fredrik O. Haarbye, Indianapolis, Ind., assignor to P. R. Mallory & CO., Inc., Indianapolis, Ind.

Continuation of Ser. No. 457,069, April 1, 1974, abandoned. This application Sept. 29, 1975, Ser. No. 617,340
Int. Cl.² C22C *5/10*
U.S. Cl. 75—173 A **7 Claims**

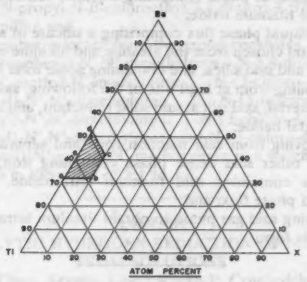
1. A method of making silver-cadmium oxide-tin oxide type electrical contact materials comprising the steps of providing wire containing Ag-Cd-Sn, reducing the wire into a plurality of three-dimensional shapes, subjecting the three-dimensional shapes containing Ag-Cd-Sn to an oxygen containing atmosphere and heat to oxidize oxidizable constituents, consolidating the oxidized three-dimensional shapes, forming the consolidated three-dimensional shapes into the desired shape.

3,989,517

TITANIUM-BERYLLIUM BASE AMORPHOUS ALLOYS

Lee E. Tanner, Summit; Ranjan Ray, Morristown, both of N.J., and Carl F. Cline, Walnut Creek, Calif., assignors to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 519,394, Oct. 30, 1974, abandoned. This application Apr. 28, 1975, Ser. No. 572,563
Int. Cl.² C22C *14/00*
U.S. Cl. 75—175.5 **6 Claims**



1. A high strength, low density metal alloy that is substantially amorphous, characterized in that the alloy comprises about 48 to 68 atom percent titanium and about 32 to 52 atom percent beryllium, with a maximum of up to 10 atom percent of beryllium replaced by at least one additional alloying element selected from the group consisting of the transition metals listed in Groups IB to VIIB and Group VIII, Rows 4, 5 and 6, of the Periodic Table and of the metalloid elements — phosphorus, boron, carbon, aluminum, silicon, tin, germanium, indium and antimony.

3,989,518

PRODUCTION OF POWDER METALLURGICAL PARTS BY FORMATION OF SINTERED PREFORMS IN THERMALLY DEGRADABLE MOLDS

Roger L. Rueckl, Franklin Boro, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed May 8, 1975, Ser. No. 575,687
Int. Cl.² B22F *3/16*
U.S. Cl. 75—211 **8 Claims**

1. A method for the production of sintered powder metal preforms, which comprises,

blending an essentially dry mixture of finely divided (a) metal particles and (b) organic binder particles to obtain a uniform distribution thereof, wherein a major portion of said finely divided particles are finer than minus 6 mesh, wherein said organic binder particles are from about 1.5 to 10.0 percent of the total mixture,

packing a thermally degradable mold with said blended mixture,

in a protective atmosphere, heating the packed mold to a temperature within the range 1200°–2400° F for a time sufficient to achieve sintering of said metal particles, thereby forming a sintered preform with sufficient green strength for further processing,

said organic binder consisting essentially of compounds, which on heating to said sintering temperature, decompose (i) to a polycyclic structure with sufficient bonding strength to maintain the integrity of the packed structure until said metal particles sinter together, (ii) at a rate which is sufficiently slow to avoid disruption of the

packed structure and containing less than 1.5% sucrose, said sucrose being below that which will maintain said integrity of the packed structure;

said mold, (i) being so constructed that, on heating to said sintering temperature, it will degrade only after said organic binder has decomposed to form said polycyclic structure, and (ii) being formed of a material which degrades at a temperature below said sintering temperature.

3,989,519

MEANS FOR IMPROVING THE CONTRAST OF AN ELECTROSTATIC LATENT IMAGE

Oleg Szymber, Elk Grove, Ill., assignor to GAF Corporation, New York, N.Y.

Filed Sept. 3, 1974, Ser. No. 502,628

Int. Cl.² G03G *13/14*

U.S. Cl. 96—1 R **11 Claims**

1. In a method for the contrast enhancement of an electrostatic latent image on a dielectric surface which comprises: positioning a photoconductive member adjacent said dielectric surface in a manner forming an air gap therebetween, applying an electrical potential between said photoconductive member and said dielectric surface, and irradiating selected portions of said photoconductive member, to cause electric charge formation on selected portions of said dielectric surface corresponding to said irradiated photoconductive member portions as a result of charge transfer between said photoconductive member and said dielectric when the voltage drop across said air gap bounded by facing surfaces of said photoconductive member and said dielectric exceeds a predetermined minimum value; the improvement comprising:

applying said electrical potential as a plurality of discrete pulses of similar polarity, said pulses being of a duration such that said voltage drop across said air gap will exceed said predetermined minimum value in the selected irradiated portions of said photoconductor and will be below said predetermined minimum value in the non-irradiated portions thereof, said pulses of electrical potential being separated by time periods in which said applied electrical potential is essentially zero, said latter periods having an average duration of at least the average duration of said pulses, whereby the relative density of electric charge in said selected portions of the dielectric surface is increased by said plurality of pulses over any electric charge density in the portions of said dielectric surface which do not correspond with the irradiated photoconductive member portions.

3,989,520

ELECTROPHOTOGRAPHIC DUAL LAYER RECORDING MATERIAL

Jürgen Rochlitz, Breckenheim, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Continuation of Ser. No. 354,204, April 25, 1973, abandoned. This application May 20, 1975, Ser. No. 579,178

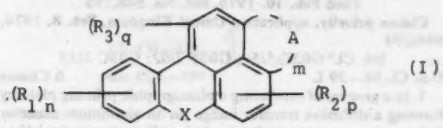
Claims priority, application Germany, Sept. 21, 1972, 2246255

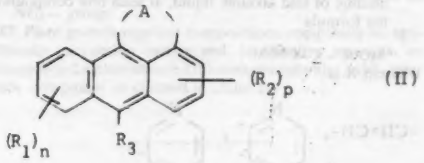
Int. Cl.² G03G *5/06*

U.S. Cl. 96—1.5 **13 Claims**

1. In an electrophotographic recording material consisting of an electroconductive support material with a photoconductive double layer of organic materials which consists of a tightly packed, homogeneous, uniform, opaque, charge carrier producing dyestuff layer prepared by vacuum-evaporation of the dyestuff and of a transparent top layer of insulating materials with at least one charge transporting compound,

the improvement in which the organic dyestuff layer consists of a compound of the general formulae





in which

X is —O— or —S— or —CO—, and

A is —CO—B—CO—, with

B being —O— or —NR—, in which

R is hydrogen, C_1–C_4 alkyl, C_3C_8 alkoxyalkyl, optionally substituted aryl or an N-heterocyclic radical, and

R_1, R_2, and R_3 are identical or different and stand for hydrogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, amino or nitro groups or halogen and, in the case of Formula I,

R_3 also may stand for a benzene ring system, fused between R_3 and A, and in which

m is 0 or 1, and

n, p, and q are integers between 1 and 4, and $n + p + q \leq 10$, and in which the transparent top layer consists of a mixture of a charge transporting, monomeric, heterocyclic compound selected from the group consisting of oxazoles, oxdiazoles, triazoles, imidazoles and pyrazoles with at least one substituted amino group or two alkoxy groups and having an extended π-electron system, and a binder selected from the group of polyester, copolyester, silicone resin, copolymer of styrene with maleic anhydride and polycarbonate resin, the mixture of the charge transporting compound and the binder being in a ratio by weight of about 1 : 1, the transparent top layer having a thickness of about 5 to about 20 microns and the dyestuff layer having a thick-

ness of about 0.005 to about 2 microns, which recording material is useful in an electrophotographic copying process with negative charging of the top layer if an electron-donating compound is used.

3,989,521

PRODUCTION OF PLANOGRAPHIC PRINTING PATTERNS ON ALUMINUM SHEETS USING SOLUTIONS CONTAINING DICARBOXYLIC ACID COMPOUNDS

Louis Maria De Haes, Edegem; Camille Angelina Vandeputte, Mortsel, and Leon Louis Vermeulen, Broechem, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Feb. 10, 1975, Ser. No. 548,755

Claims priority, application United Kingdom, Feb. 8, 1974, 5946/74

Int. Cl.² G03C *5/54;* **G03F** *7/02;* **G03C** *5/38*

U.S. Cl. 96—29 L **6 Claims**

1. In a process of producing a planographic printing plate by forming a diffusion transfer image on an aluminium sheet or foil or on a supported aluminum layer serving as an image receiving material through the steps of

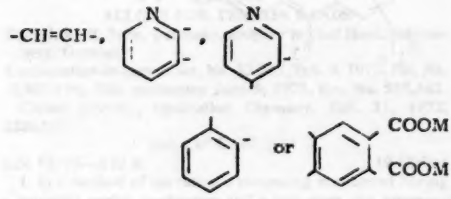
image-wise exposing a light-sensitive silver halide material,

treating said material with an aqueous alkaline liquid to develop the exposed material by means of developing agents present in said material and/or liquid, and to dissolve unexposed silver halide by means of a silver halide solvent present in said liquid, and

contacting said material with the said image receiving material to form the diffusion transfer image, the improvement which comprises using as the aqueous alkaline liquid a liquid containing, in an amount sufficient to increase the lifetime of said alkaline liquid, at least one compound of the formula

MOOC—X—COOM

wherein X is



and

M is an alkali metal

3,989,522

MANUFACTURE OF A PLANOGRAPHIC PRINTING PLATE BY MAKING SILVER HALIDE AREAS OF EMULSION OLEOPHILIC

Albert Lucien Poot, Kontich; Jan Frans Van Besauw, Mortsel, and Frans Clement, Kontich, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Feb. 18, 1975, Ser. No. 550,441

Claims priority, application United Kingdom, Feb. 26, 1974, 8708/74

Int. Cl.² G03F *7/02*

U.S. Cl. 96—33 **18 Claims**

1. A method for the preparation of a planographic printing plate containing the step of:

image-wise photo-exposing a photographic material containing a silver halide emulsion layer, in which the silver halide is present in a water-permeable colloid binder to form in said material exposed image regions and unexposed background regions,

developing the information-wise photo-exposed photographic silver halide material to leave a poorly water-soluble silver salt in one of said image and background regions, and

treating said developed material containing said poorly water-soluble silver salt in said region with an aqueous liquid to render the regions thereof containing said silver salt receptive to lithographic printing ink, said treating liquid containing dissolved therein at least one organic cationic onium compound, iodide ions, and a sufficient amount of hydronium ions (H_3O^+) for creating an acidic medium, said liquid being capable upon overall contact for 30 sec at 22° C of making an unexposed and undeveloped photographic silver halide test material sufficiently receptive to a test lithographic ink to form when used for lithographic printing with said lithographic ink, a printed ink deposit on lithographic printing paper having a spectral density of at least 0.5 measured at the absorption maximum of said ink, said photographic test material comprising a flexible polymeric film or paper support carrying a silver halide emulsion layer with the following characteristics:

1. said silver halide is silver chlorobromide (75:25 mole % chloride to bromide),
2. the average grain size of the silver halide is 0.35 micron,
3. the silver halide coverage, expressed as silver nitrate, is 10 g per sq.m.,
4. the ratio by weight of gelatin to silver halide, expressed as silver nitrate, is 5.8:10,
5. the thickness of the emulsion layer is 8 microns, and
6. the emulsion layer is coated with an anti-abrasion layer having a thickness of 0.6 micron applied from a coating composition containing gelatin, silica particles and formaldehyde, the formaldehyde being present in a weight ratio of 6:100 with respect to the gelatin, the silica particles having an average grain size of 5 microns, the coverage of silica particles being 0.01 g per sq.m, and the gelatin coverage being 0.6 g per sq.m; and said test lithographic ink has the following composition:

	parts by weight
Lake Red C (C.I. 15,585)	80
Styrenated linseed-tung oil alkyd of 60 per cent oil length and 10 per cent styrene content	100
aliphatic petroleum having a boiling range of 260-290° C	50
lead metal (as naphthenate)	1
cobalt metal (as naphthenate)	0.12.

3,989,523

REDUCING APERTURE-SIZE OF SHADOW MASK IN PAINTING BLACK MATRIX CRT SCREEN

Thomas Meirion Jackson, and Peter Gordon Eldridge, both of Bishop's Stortford, England, assignors to International Standard Electric Corporation, New York, N.Y.

Continuation of Ser. No. 473,541, May 28, 1974, and a continuation of Ser. No. 280,926, Aug. 15, 1972. This application Feb. 10, 1975, Ser. No. 548,510

Claims priority, application United Kingdom, Sept. 15, 1971, 42924/71

Int. Cl.² G03C *5/00*

U.S. Cl. 96—36.1 **5 Claims**

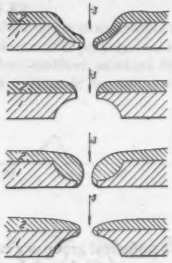
1. A method of making a black matrix shadow mask color television picture tube having an apertured shadow mask and an adjacent faceplate screen comprising the steps of:

stray-coating an opaque material on the apertured shadow mask to reduce the size of the apertures by a predetermined amount;

providing, in addition to said spray-coating operation, a separate forced air draft at a high velocity through said apertures;

forming a black matrix having a pattern of holes therein on the adjacent surface of said screen,

said holes being formed through said mask to be equal in size to the size of said reduced apertures;



enlarging the apertures in said mask to their original size; and

forming a pattern of phosphor dots in said holes of said, said dots being formed through said enlarged apertures of said mask so that the dots overlap and are larger than the holes.

3,989,524

METHOD FOR MANUFACTURING A COLOR CATHODE RAY TUBE USING MASK AND SCREEN MASTERS

Kazimir Palac, Carpentersville, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Dec. 23, 1974, Ser. No. 535,780

Int. Cl.² G03C *5/00*

U.S. Cl. 96—36.1 **18 Claims**

1. In the manufacture of a color cathode ray tube having an envelope including a funnel and a faceplate having a predetermined three-dimensional curvature and having thereon screen referencing means, the method comprising:

providing an assembly including an electrically conductive shadow mask blank having a curved central portion whose curvature is closely related to the curvature of said faceplate and including a stiffening peripheral portion carrying a mask suspension system;

providing a mask master and a set of screening masters, including red, blue and green phosphor pattern masters, said mask and screening masters having thereon interregisterable master stencil patterns, said screening masters each having a curvature corresponding to that of the faceplate, said mask master having a curvature corresponding to that of the mask blank;

photochemically forming said central portion of said mask blank, with reference to the mask suspension system, a pattern of electron-transmissive apertures using said mask master as a photographic stencil;

while using said screening masters as photographic stencils, photochemically depositing on a concave inner surface of said faceplate, with reference to said screen referencing means on said faceplate, interleaved patterns of red-emissive, blue-emissive and green-emissive phosphor elements; and

with said mask suspension system, suspending the resultant etched mask adjacent said faceplate with reference to said screen referencing means on said faceplate such that said pattern of mask apertures is registered with said patterns of phosphor elements on said faceplate.

3,989,525

N-ISOPROPYL-2-CHLOROETHANE-(THIONO)-PHOSPHONIC ACID ESTER AMIDE COMPOUNDS AND HERBICIDAL COMPOSITIONS

Wolfgang Hofer, Wuppertal, and Klaus Lurssen, Gross-Koenigsdorf, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

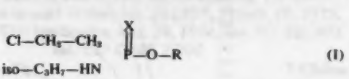
Filed Mar. 31, 1975, Ser. No. 563,760

Claims priority, application Germany, Apr. 27, 1974, 2420627

Int. Cl.² A01N *9/36*; **C07F** *9/24*

U.S. Cl. 71—86 **22 Claims**

1. N-isopropyl-2-chloroethane-(thiono)-phosphonic acid ester amide compounds of the general formula:



(I)

wherein

X is oxygen or sulfur, and

R is acetyl or a group of the formula

wherein

X′ is oxygen or sulfur,

R′ is alkoxy of from 1 to 4 carbon atoms or 2-chloroethyl, and

R″ is alkoxy or alkylamino of up to 4 carbon atoms or an NH_2— group.

17. Plant growth regulant compositions comprising an agriculturally acceptable carrier and, in effective amounts, an N-isopropyl-2-chloroethane-(thiono)-phosphonic acid ester amide compound as claimed in claim 1.

3,989,526

PROCESSING COMPOSITIONS COMPRISING INERT TRANSITION METAL COMPLEX OXIDIZING AGENTS AND REDUCING AGENTS

Vernon Leon Bissonette, Brockport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 420,194, Nov. 28, 1973, Pat. No. 3,862,842, which is a continuation-in-part of Ser. No. 189,289, Oct. 14, 1971, abandoned, and a continuation-in-part of Ser. No. 256,072, May 23, 1972, Pat. No. 3,834,907, which is a continuation-in-part of Ser. No. 150,741, June 7, 1971, abandoned. This application Sept. 5, 1974, Ser. No. 503,405

Int. Cl.² G03C *5/24*, *5/32*, *7/00*, *5/30*

U.S. Cl. 96—48 R **11 Claims**

1. A processing composition comprising a reducing agent and an inert transition metal complex oxidizing agent which undergo redox reaction in a liquid medium in the presence of catalytic material which is a zero valent metal or chalcogen of a Group VIII or 1B element, wherein said liquid is a solvent for said reducing agent and said inert transition metal ion complex, said inert transition metal complex comprising (a) Lewis bases and (b) Lewis acids which are capable of existing in at least two valence states and said oxidizing agent and said reducing agent being so chosen that (1) the reaction products thereof are noncatalytic for said oxidation-reduction reaction and (2) when test samples thereof are each dissolved in an inert solvent at a concentration of about 0.01 molar at 20° C., there is essentially no redox reaction between said oxidizing agent and said reducing agent, and said oxidizing agent being a complex of a metal ion with a liquid which, when a test sample thereof is dissolved at 0.1 molar concentration at 20°

C. in an inert solvent solution containing a 0.1 molar concentration of a tagged ligand of the same species which is uncoordinated, exhibits essentially no exchange of uncoordinated and coordinated ligands for at least 1 minute.

3,989,527

SILVER HALIDE PHOTOGRAPHIC ELEMENT CONTAINING BLENDED GRAINS

David J. Locker, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 8, 1975, Ser. No. 539,476
Int. Cl.² G03C 1/76, 1/02
U.S. Cl. 96—69 **9 Claims**

1. A photographic element comprising a support and, coated thereon, a radiation-sensitive layer containing

silver halide grains having a mean particle size greater than about 0.9 micron in diameter and having 3,3′,9-triethyl-5,5′-diphenyloxacarbocyanine bromide and anhydro-5,5′,-6,6′-tetrachloro-1,1′,3-triethyl-3′-(3-sulfobutyl)-benzimidazolocarbocyanine hydroxide as spectral sensitizers adsorbed on the surface thereof and

intimately admixed therewith reflecting silver halide grains free of surface spectral sensitization and having a particle size greater than 0.40 micron and less than 0.60 micron in diameter, which, upon exposure, cause electromagnetic radiation to impact upon the surface of the spectrally sensitized silver halide grains.

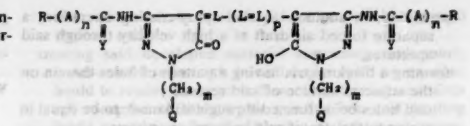
3,989,528

DYE-CONTAINING SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

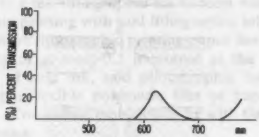
Masatoshi Sugiyama; Tohru Sueyoshi; Yasuharu Nakamura; Takeo Shimada, and Koutaro Yamasue, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed May 19, 1975, Ser. No. 578,798
Claims priority, application Japan, May 17, 1974, 49-55110
Int. Cl.² G03C 1/84
U.S. Cl. 96—84 R **9 Claims**

1. A silver halide photographic light-sensitive material containing in at least one hydrophilic colloidal layer at least one dye represented by the following general formula (I)



wherein R represents an alkyl group or alkenyl group; A represents an —NH— group; Y represents an oxygen atom or a sulfur atom; Q represents an aryl group substituted with at least



one of a sulfo group, a sulfoalkyl group or a carboxy group; n is 0 or 1; m represents an integer of 0, 1, or 2; L represents a methine group and p represents an integer of 0, 1, or 2.

3,989,529

HYDROPHILIC COUPLER SOLUTIONS

Felix Viro, Apalachin, N.Y., and Salvatore Emmi, Portland, Oreg., assignors to GAF Corporation, New York, N.Y.

Filed Oct. 29, 1974, Ser. No. 518,798
Int. Cl.² G03C 1/31
U.S. Cl. 96—100 **19 Claims**

1. A hydrophilic color coupler solution for use in gelatin silver halide emulsions comprising a water soluble color coupler having at least one solubilizing moiety selected from the group consisting of sulfo and carboxy moieties and an additive selected from the group consisting of a diepoxide, ethylene glycol diglycidyl ether, pyruvaldehyde and 2,3 butanedione.

3,989,530

PROCESS FOR RECORDING PHASE HOLOGRAMS USING ENERGY-ACTIVATED SENSITIZER

Jean Jules Achille Robillard, 4, Chemin des Fleurs, 01-Ferney Voltaire, France

Continuation of Ser. No. 452,555, March 19, 1974, abandoned. This application Feb. 11, 1976, Ser. No. 657,280
Int. Cl.² G03C 5/04, 5/00; G02B 27/08
U.S. Cl. 96—27 H **8 Claims**

5. A process for recording phase holograms, including the steps of:

preparing a normally transparent photosensitive recording composition, wherein said recording composition is selected from photopolymerizable and photodegradable compositions;

chromatically sensitizing said recording composition by applying a sensitizing energy outside the visible light range to said recording composition whereby a chromatic sensitizer is temporarily formed in situ and maintained therein;

holographically exposing said recording composition with radiation, in the visible light range, to effect local variations of refractive index in the exposed, sensitized areas of said recording composition;

desensitizing said recording composition by ceasing to apply said sensitizing energy to said recording composition, thereby returning said recording composition to its normally transparent state with local variations of index of refraction according to said step of holographic exposure.

3,989,531

FIRE-RETARDANT POLYMERIC COMPOSITIONS CONTAINING BROMINATED BIPHENOLS

Charles M. Orlando, Schenectady, N.Y., and Francois A. Lavallee, Willoughby, Ohio, assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 169,517, Aug. 5, 1971, Pat. No. 3,929,908. This application Mar. 12, 1974, Ser. No. 450,364

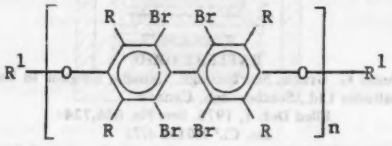
Int. Cl.² C08K *5/13;* C09D *5/18;* C09K *3/28*

U.S. Cl. 106—15 FP 11 Claims

1. A fire-retardant polymeric composition comprising

a. a normally flammable polystyrene resin, and

b. a fire-retardant additive selected from halogenated monomeric and polymeric organic compounds of the formula:



wherein each R independently is selected from primary alkyl groups, each R^1 independently is selected from hydrogen, or organic radicals, and *n* is a positive integer of at least 1.

3,989,532

ANTI-MISTING INORGANIC OXIDE GLASS COMPOSITIONS

Neil Hunter Ray; William Derek Robinson, and Cyril John Lewis, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Feb. 4, 1974, Ser. No. 439,598

Claims priority, application United Kingdom, Feb. 21, 1973, 8489/73; June 25, 1973, 30030/73

The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.

Int. Cl.² C03C *3/00*

U.S. Cl. 106—47 Q 19 Claims

1. An optical article at least part of the surface of which is an inorganic oxide glass having a P_2O_5 content of at least 52 mole %, an alkaline earth oxide content of 2.7 to 20 mole %, said percentages based on 100% of the total composition, and a transformation temperature range of not greater than 300° C.

3,989,533

COMPOSITION FOR USE IN FORMING HEAT INSULATING HOT TOP LINERS AND METHOD OF MAKING SAME

Edward John Jago, Berea, Ohio, assignor to Foseco International Limited, England

Continuation of Ser. No. 242,746, April 10, 1972, abandoned, which is a continuation of Ser. No. 740,036, June 26, 1968, abandoned. This application Sept. 13, 1974, Ser. No. 505,772

Int. Cl.² C04B *35/80*

U.S. Cl. 106—55 9 Claims

1. A composition for use in forming heat insulating liners comprising, by weight, a mixture of 0 to about 20% of a pulverized organic fibrous material, 0 to about 40% of a pulverized inorganic fibrous material, about 50 to about 90% of a particulate refractory material, and only a sufficient amount of a liquid carrier to prevent dusting, with the proviso that the total percent of the pulverized organic and inorganic fibrous materials is from about 5 to about 50%, said mixture being capable of being dispersed to form a slurry by the addition of a liquid carrier.

3,989,534

FOAMED CEMENTITIOUS COMPOSITIONS AND METHOD OF PRODUCING SAME

Mark Plunguian, 6912 Columbia Drive, and Charles E. Cornwell, 7104 Marlan Drive, both of, Alexandria, Va. 22307

Continuation-in-part of Ser. No. 342,859, March 19, 1973, abandoned. This application Aug. 29, 1974, Ser. No. 501,673

Int. Cl.² C04B *21/00*

U.S. Cl. 106—86 7 Claims

1. A low density cementitious foamed composition comprising 100 parts by weight of a mineral cement; about 10–50 parts by weight of a filler, selected from the group consisting of an exfoliated lightweight aggregate and hollow silicate spheres; about 1–20 parts by weight of an organic, water-soluble film former selected from the group consisting of guar gum, pregelatinized starch, xanthan gum, and protein colloids; about 0.1–3.0 parts by weight of surface active foaming agents; and at least about 8% by volume, based on the total volume of said components, of air, said cementitious composition having been processed with from about 30 to about 150 parts by weight of water.

3,989,535

SOLUTION OF POLY(N-ACETYL-D-GLUCOSAMINE)

Richard Carl Capozza, Palo Alto, Calif., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 441,717, Feb. 11, 1974, abandoned. This application Mar. 14, 1975, Ser. No. 558,525

Int. Cl.² C08L *1/00;* C07C *95/04*

U.S. Cl. 106—203 3 Claims

1. A solution consisting essentially of poly(N-acetyl-D-glucosamine) dissolved in a fluorinated solvent selected from the group consisting of hexafluoroisopropyl alcohol and hexafluoroacetone sesquihydrate, and from which the poly(N-acetyl-D-glucosamine) can be recovered essentially undegraded.

3,989,536

SUGAR CENTRIFUGE WITH A DEVICE FOR BLOCKING AND UNBLOCKING AN OPENING THEREOF

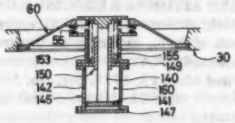
Wolfgang Werner, Braunschweig, Germany, assignor to Salzgitter Maschinen Aktiengesellschaft, Salzgitter, Germany

Division of Ser. No. 484,325, June 28, 1974, abandoned. This application Dec. 22, 1975, Ser. No. 643,510

Claims priority, application Germany, June 29, 1973, 2333122

Int. Cl.² C13F *1/06*

U.S. Cl. 127—19 7 Claims



1. In a centrifuge, particularly a sugar centrifuge, a combination comprising a centrifuge drum mounted for rotation

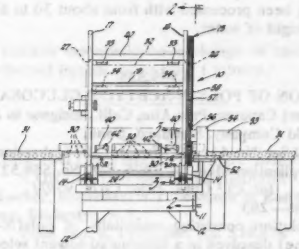
about an upright axis and having a bottom wall provided with an opening; a closure member mounted for movement relative to said bottom wall between a first position in which it sealingly blocks said opening and a second position in which it unblocks said opening; fluid pressure actuated means operative for moving said closure member to said first position and maintaining it in said first position for as long as desired, said fluid pressure actuated means comprising a cylinder and piston unit having a piston rod connected with said drum and projecting from said bottom wall, a sleeve slidably surrounding said piston rod, coupling means for coupling said sleeve to said closure member for joint movement, and a cylinder also surrounding said piston rod and connected to said sleeve; and conduit means communicating with the interior of said cylinder and including connecting means for connecting the latter with a source of pressure fluid.

3,989,537

METHOD AND APPARATUS FOR VIBRATION CLEANING OF WORKPIECES SUCH AS ENGINE BLOCKS

Edgar W. Sickmeier, Greenwood, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed July 11, 1975, Ser. No. 595,041
Int. Cl.² B08B 7/02
U.S. Cl. 134—1 **3 Claims**



1. A method for cleaning debris from a workpiece, such as an engine block, said method comprising

supporting a workpiece to be cleaned in a manner permitting limited torsional movement of such workpiece about a longitudinal axis through its center of gravity,

applying an unbalanced shaking force to said workpiece at a point distant from said longitudinal axis, said force being applied at a frequency and magnitude sufficient to cause said workpiece to resonante in a torsional mode with an amplitude sufficient to loosen debris from the surfaces of said workpiece but below a level which will damage said workpiece, and

rotating said workpiece about an axis while in said resonating condition to permit loosened debris to fall from said workpiece surfaces.

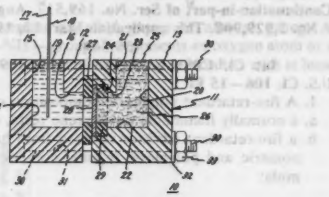
3,989,538

SEALED LITHIUM-REDUCIBLE GAS CELL

Walter L. Roth, Schenectady, and Gregory C. Farrington, Elnora, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 19, 1975, Ser. No. 559,901
Int. Cl.² H01M 10/34
U.S. Cl. 429—101 **4 Claims**

1. A sealed lithium-reducible gas cell comprises a casing, an anode positioned within the casing, the anode selected from the class consisting of lithium, lithium as an amalgam and lithium in a non-aqueous electrolyte, a cathode positioned within the casing, the cathode comprising a reducible gas in a non-aqueous solvent with an ionic conductivity enhancing material, and a solid lithium-sodium aluminate electrolyte positioned within the casing between the anode and cathode and in contact with both the anode and cathode, the solid



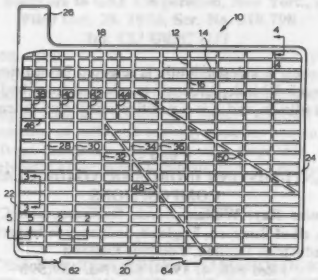
lithium-sodium aluminate electrolyte having an approximate composition of $LiNaO.9Al_2O_3$ of which 1.3 to 85% of the total alkali ion content is lithium.

3,989,539

BATTERY GRID

Nicholas G. Grabb, Scarborough, Canada, assignor to Varta Batteries Ltd., Scarborough, Canada

Filed Dec. 1, 1975, Ser. No. 636,724
Int. Cl.² H01M 4/72
U.S. Cl. 429—241 **6 Claims**



1. An improved rectangular shaped lead-acid storage battery grid comprising in combination, a plurality of interconnected vertical and horizontal grid wires surrounded by and connected to top, bottom and first and second side frame wires with a lug on said top frame wire adjacent said first side frame wire, a series of said vertical grid wires are each tapered and which increase in cross-sectional area in a direction towards the top of said grid, the first of the tapered vertical wires being adjacent said first side frame wire, the last of the tapered vertical grid wires in said series being spaced from said first side frame wire a distance of more than approximately 30 percent and up to approximately 50 percent of the entire length of said top frame wire, said top and first side frame wires being tapered and increasing in cross-sectional area in a direction towards said lug, additional vertical grid wires positioned between adjacent tapered vertical grid wires of said series, said additional vertical grid wires extending downwardly from said top frame wire a distance of approximately 30 to 50 percent of the length of a side frame wire, said additional vertical grid wires being interconnected to said horizontal grid wires, two diagonal grid wires spaced apart from each other and extending away from the portion of said battery grid containing said additional vertical grid wires, one of the diagonal grid wires extending to the bottom frame wire and the other diagonal grid wire extending to said second side

frame wire, said diagonal grid wires being interconnected with said vertical and horizontal grid wires.

3,989,540

METHOD FOR PREPARING ELECTROCHEMICAL ELEMENTS IN THIN LAYERS

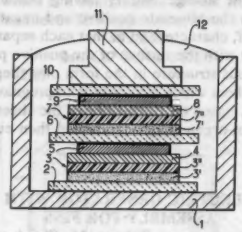
Georges Feuillade, Arpajon; Bernard Chenaux, Paris, and Philippe Perche, Bures-sur-Yvette, all of France, assignors to Compagnie Generale d'Electricite, Paris, France

Filed May 2, 1974, Ser. No. 466,339

Claims priority, application France, May 18, 1973, 73.18171; Sept. 21, 1973, 73.33972

Int. Cl.² H01M *35/18*

U.S. Cl. 29—623.1 **15 Claims**



1. A method for producing an electrochemical element comprising successively, a first thin layer constituting an electronically conductive cathode collector, a second thin layer forming a catholyte comprising a substance suitable for providing anions capable of forming a discharge product with the substance of an anode, a third thin layer forming a separator impermeable to the said catholyte and a fourth thin anode layer comprising lithium, said method comprising the steps of:

A. forming a catholyte comprising a polyvinylic acetal impregnated with a solvent, a material suitable for providing anions capable of forming a discharge product with an anode and, an anionically conductive salt, such that the ratio of the weight of the acetal to the solvent saturated with ionically conductive salt is between about 0.05 and 0.15 and the ratio of the weight of the material suitable for providing anions to the total weight of the acetal, solvent and conductive salt is between about 1 and 9,

B. applying the catholyte obtained in (A) to the pores of a conductive grid connected to a conductive substrate such that the thickness of the gel is substantially equal to the thickness of the grid,

C. placing the element obtained in (B) between said cathode layer and said anode layer such that the catholyte is separated from the anode layer by said separator.

3,989,541

SOLAR CELL ASSEMBLY

Henry W. Brandhorst, Jr., Berea, Ohio, assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.

Filed Sept. 30, 1974, Ser. No. 510,677

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² H01L *31/00, 31/04*

U.S. Cl. 136—89 **9 Claims**

1. A solar cell assembly comprising

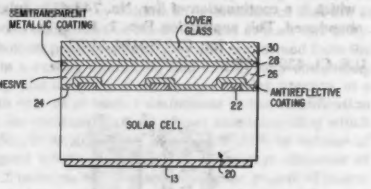
a solar cell, and

a semi-transparent metallic layer of approximately 100–1000 Angstroms thickness, which covers substantially the entire upper surface of the solar cell, for controlling the radiant energy which is transmitted to the solar cell.

8. A solar cell assembly comprising

a solar cell,

a cover plate for protecting the upper surface of said solar cell,



a semi-transparent metallic layer on the surface of the said cover plate facting said protected surface of said solar cell, and

a high emissivity, low absorptivity anti-reflective layer overlying said protected surface of the solar cell, said cover plate being secured to said anti-reflective layer.

3,989,542

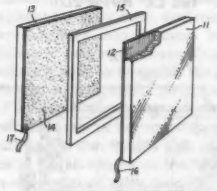
PHOTOGALVANIC DEVICE

William Donald Kennedy Clark, Westfield, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 463,057, April 22, 1974, abandoned. This application Feb. 14, 1975, Ser. No. 549,962

Int. Cl.² H01L *31/00, 31/04*

U.S. Cl. 136—89 **10 Claims**



1. A photogalvanic device comprising:

a. a light-permeable cell;

b. a light-sensitive liquid electrolyte comprising:

1. a solution of a photoreducible dye; and

2. a material selected from the group consisting of a salt of iron, a salt of cobalt which is complexed with a chelating agent, and hydroquinone.

c. a first electrode comprising a "N" type semiconductor material having a bandgap greater than 3 electron volts;

d. a second electrode comprising an elemental metal having a valence state of at least 2;

e. a spacer element separating said first and second electrodes;

f. means to seal the cell and exclude air therefrom; and

g. means for connecting said electrodes to an external circuit, said first and second electrodes being chemically inert to the electrolyte solution and in contact therewith.

10. The device as in claim 1 wherein the light-sensitive electrolyte consists of a solution of thionine and an iron salt, the first electrode consists of stannic oxide and the second electrode consists of platinum.

3,989,543

ELECTROCHEMICAL CELL HAVING LEAD FLUORIDE CATHODE

Philip Krasnow, Brooklyn, N.Y., assignor to Mitchell Kurzban, Melville, N.Y., a part interest

Continuation of Ser. No. 37,453, May 18, 1970, abandoned, which is a continuation of Ser. No. 743,475, July 9, 1968, abandoned. This application Feb. 2, 1972, Ser. No. 223,043

Int. Cl.² H01M 35/02

U.S. Cl. 429—118 11 Claims

1. In an electrochemical cell activatable by the addition thereto of a conductive electrolyte, said cell including an anode comprising a metal more electropositive than lead fluoride, the improvement comprising a self-supporting cathode comprising lead fluoride and not more than twenty five percent by weight of lead fluoride of dope.

3,989,544

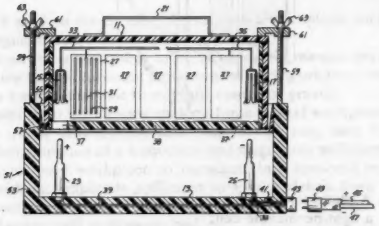
QUICK DISCONNECT BATTERY

Charles P. Santo, 21643 Visnaw, St. Clair Shores, Mich. 48081

Continuation of Ser. No. 390,355, Aug. 22, 1973, abandoned. This application July 28, 1975, Ser. No. 599,637

Int. Cl.² H01M 2/20

U.S. Cl. 429—65 8 Claims



1. In a storage battery of the wet cell type having a hollow case and a plurality of separately enclosed wet cells therein, with each wet cell having internal positive and negative plates, and conventional connector means extending between adjacent wet cells to connect all the wet cells together, the improvement comprising:

a closure base on said hollow case;

said conventional connector means including a first connector strap extending from a wet cell and terminating in a positive terminal socket inwardly of said hollow case and externally of all said wet cells and spaced apart from said closure base;

said conventional connector means including a second connector strap extending from a wet cell and terminating in a negative terminal socket inwardly of said hollow case and externally of all said wet cells and spaced apart from said closure base; and

a pair of bores in said closure base, each bore in axial registry with one of said terminal sockets, each bore adapted to receive a terminal post therethrough so that the terminal posts may fit snugly into said sockets interiorly of said hollow case and exteriorly of said wet cells.

3,989,545

SEPARATORS FOR A STORAGE BATTERY

Takashi Ito, Toyonaka, and Hironori Matsui, Hirakata, both of Japan, assignors to Kanebo, Ltd., Tokyo and Matsushita Electric Industrial Co., Ltd., Kodama, both of, Japan

Filed Apr. 7, 1975, Ser. No. 565,350

Claims priority, application Japan, Apr. 11, 1974, 49-41305

Int. Cl.² H01M 2/14

U.S. Cl. 429—246 7 Claims

1. A lead-acid storage battery having porous separators placed between the alternate positive and negative plates in the cells thereof, characterized in that each separator, placed in close contact with the surface of the positive plate, is composed of a fibrous structure in the form of a sheet of organic high polymer fibers which structure is impregnated with 1 to 50% by weight, based on the weight of the sheet not yet impregnated, of an organopolysiloxane and then cured.

3,989,546

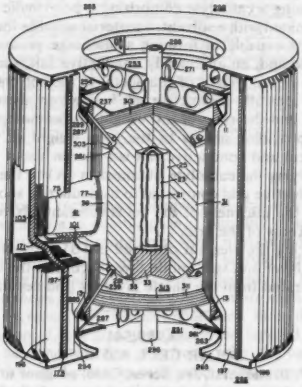
THERMOELECTRIC GENERATOR WITH HINGED ASSEMBLY FOR FINS

David L. Purdy, Indiana; Zalman M. Shapiro; Thomas F. Hursen, both of Pittsburgh, and Gerould W. Maurer, Apollo, all of Pa., assignors to ARCO Medical Products Company, Leechburg, Pa.

Division of Ser. No. 142,070, May 10, 1971, Pat. No. 3,822,151. This application Mar. 11, 1974, Ser. No. 449,818

Int. Cl.² H01L 35/02; G21H 1/10

U.S. Cl. 136—202 7 Claims



1. In a generator comprising a casing, a radioactive fuel capsule suspended within said casing, at least one thermoelectric module having both a cold junction and a hot junction, said hot junction absorbing heat from said capsule, the improvement comprising:

a cup-shaped fin-transition member adapted normally to be in heat exchange realationship with matching surfaces of the cold junction of the thermoelectric module with which said fintransition member is associated;

a plurality of fins connected to opposite faces of said fin transition member;

hinging means associating said fin-transition member with said casing whereby said fin-transition member can be

swung away from said cold junction whenever access to its thermonuclear module is desired; and

means adapted, except during such access to its thermonuclear module, to secure said hinged fin-transition member in said heat exchange relationship with said cold junction.

3,989,547

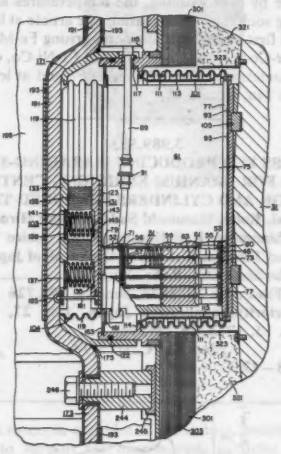
THERMOELECTRIC GENERATOR HAVING A RESILIENTLY MOUNTED REMOVABLE THERMOELECTRIC MODULE

David L. Purdy, Indiana; Zalman M. Shapiro, Pittsburgh; Thomas F. Hursen, Monroeville, and Gerould W. Maurer, Apollo, all of Pa., assignors to ARCO Medical Products Company, Leechburg, Pa.

Division of Ser. No. 142,070, May 10, 1971, Pat. No. 3,822,151, which is a continuation of Ser. No. 601,697, Dec. 14, 1966, abandoned. This application Mar. 11, 1974, Ser. No. 449,819

Int. Cl.[2] H01L *35/06*

U.S. Cl. 136—205 3 Claims



3. In a generator including a heat source, a thermoelectric module having a hot junction and a cold junction, and a heat sink including a thermally conducting plate through which heat is dissipated to fins, the improvement which consists of a shock-mount support for said module interposed between said cold junction and said plate, said support including resilient means urging said hot junction into effective heat-exchange relationship with said heat source, said support also including deformable highly-thermally conducting means thermally connecting said cold junction and said plate and providing a deformable highly-thermally conducting path from said cold junction to said plate, said deformable means being spaced from said resilient means, said deformable means consisting of crinkled copper strips.

3,989,548

ALUMINUM ALLOY PRODUCTS AND METHODS OF PREPARATION

Larry Roy Morris, Yarker, Canada, assignor to Alcan Research and Development Limited, Montreal, Canada

Filed May 17, 1974, Ser. No. 471,133

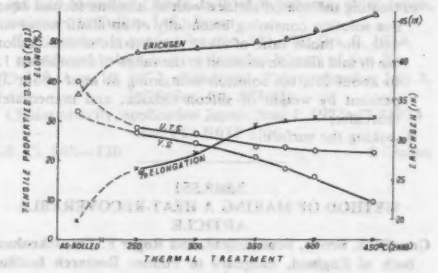
Claims priority, application United Kingdom, May 17, 1973, 23684/73; Mar. 5, 1974, 9946/74

Int. Cl.[2] C22F *1/04*

U.S. Cl. 148—2 35 Claims

1. A method of producing dispersion-strengthened aluminum alloy products which comprises

a. casting an alloy having a major content of aluminum and a minor content of at least one alloying element, the content of alloying elements in said alloy being not more than about 10% each, not more than about 20% total, and lying between 20% less than and 10% more than the value of a eutectic composition, said alloy being castable to develop 5.0–20% by volume of intermetallics that are at least one compound of aluminum and at least one alloying element present in said alloy and are formed from the melt in a casting operation, said casting step comprising casting said alloy, by a continuous casting process, at a growth rate of at least 1 cm/minute at the solidification front, for producing a mass of cast aluminum alloy which includes, in an aluminum matrix, 5.0–20% by volume of unaligned intermetallic rods of an average diameter of 0.1–1.5 microns, and for suppressing the growth of coarse primary intermetallic particles ranging upwardly of 3 microns in diameter such that said mass of cast alloy contains not more than 2% by volume of said coarse primary intermetallic particles, and



b. working the cast aluminum alloy to effect at least 60% reduction thereof for breaking up said intermetallic rods into intermetallic particles, and for dispersing said particles throughout the alloy mass, said rods being broken up by the working step into particles having an average particle diameter ranging between about 0.1 micron and about 2 microns, such as to enable the particles to generate and stabilize a dislocation cell of not more than about 3 microns in magnitude during cold deformation and to hold a grain diameter of not more than about 3 microns after annealing and also to hold high angle misorientation boundaries in the aluminum matrix, thereby to provide a dispersion-strengthened alloy product.

19. A method according to claim 1 in which the cast aluminum alloy mass is subjected to at least 60% reduction by cold working.

20. A method according to claim 19 in which the cold worked aluminum alloy is subjected to a final heat treatment at a temperature in the range of 230° – 450° C.

3,989,549

METHOD OF MAKING INCANDESCENT LAMP

Frank Cangiano; Stephen A. Reed, III, both of Hillsboro; Wilfred L. Boule, Antrim, and David R. Dayton, Bow, all of N.H., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Apr. 21, 1975, Ser. No. 570,284

Int. Cl.[2] H01K *1/08*

U.S. Cl. 148—6.3 1 Claim

1. In a process of manufacturing an incandescent lamp containing a coiled tungsten filament within a glass envelope, the steps which comprise: coiling tungsten wire on a mandrel to form a coiled filament; heating said coiled filament to about 800° C in a phosphorus atmosphere to form tungsten monophosphide on the surface of the filament; then heating said coiled filament to a temperature of at least about 1300° C in a reducing atmosphere or vacuum to dissociate the tungsten

monophosphide and evaporate the phosphorus therefrom; then dissolving said mandrel from said filament; and mounting said filament in said incandescent lamp.

3,989,550

METHOD OF FORMING A HYDROPHILIC COATING ON AN ALUMINUM SURFACE

Nelson J. Newhard, Plymouth Meeting, Pa., assignor to Amchem Products, Inc., Ambler, Pa.

Filed Apr. 21, 1975, Ser. No. 570,307
Int. Cl.² C23F 7/14, 7/26
U.S. Cl. 148—6.16 10 Claims

1. A method of forming a hydrophilic coating on an aluminum surface comprising the steps of:

a. etching the aluminum surface with an aqueous etching solution to provide a rough surface;

b. treating the etched surface with an acidic first aqueous solution consisting essentially of active fluoride, chromate ion and phosphate ion to form a coating having a coating weight of at least 150 mg/sq.ft.;

c. treating the coated surface with an alkaline second aqueous solution consisting essentially of an alkali metal silicate, the molar ratio of alkali metal oxide to silicon dioxide in said alkaline solution in the range of from about 1:4 to about 2:1, the solution containing at least about .05 percent by weight of silicon dioxide; and immediately thereafter

d. baking the surface.

3,989,551

METHOD OF MAKING A HEAT-RECOVERABLE ARTICLE

Greville B. Brook, Beaconsfield, and Roger F. Iles, Ickenham, both of England, assignors to Fulmer Research Institute Limited, Stoke Poges, England

Continuation-in-part of Ser. No. 88,970, Nov. 12, 1970, abandoned. This application Feb. 12, 1975, Ser. No. 549,328
Claims priority, application United Kingdom, Nov. 12, 1969, 55481/69; Nov. 14, 1969, 55969/69
Int. Cl.² C22D 1/00
U.S. Cl. 148—11.5 R 14 Claims

1. A method of making a heat-recoverable article which comprises cooling an article in a first shape from a first temperature to a lower temperature, said article being formed from an alloy comprising at least one phase in the form of a primary solid solution of a first metal with at least one other metallic element, which solution on cooling from said first temperature at least partially transforms into an essentially banded martensite, and then deforming the article into a second shape, the temperatures and rate of cooling being such that, on reheating, the article at least partly resumes said first shape, said alloy comprising titanium, manganese, cobalt or mixtures thereof alloyed with niobium, molybdenum, iron, nickel, chromium, vanadium or mixtures thereof.

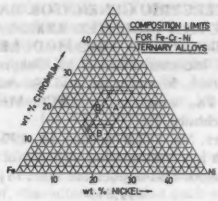
3,989,552

METHOD OF MAKING A HEAT-RECOVERABLE ARTICLE

Greville B. Brook, Beaconsfield, and Roger F. Iles, Ickenham, both of England, assignors to Fulmer Research Institute Limited, Stokes Poges, England

Continuation-in-part of Ser. No. 88,970, Nov. 12, 1970, abandoned. This application Sept. 30, 1974, Ser. No. 510,172
Claims priority, application United Kingdom, Nov. 12, 1969, 55481/69; Nov. 14, 1969, 55969/69
Int. Cl.² C22D 1/00; C21D 7/02
U.S. Cl. 148—11.5 R 7 Claims

1. A method of making a heat-recoverable article which comprises cooling an article in a first shape from a first temperature to a lower temperature, said article being formed from an alloy comprising at least one phase in the form of a primary solid solution of a first metal with at least one other metallic element which increases the stability of a high temperature phase of the first metal, which solution on cooling from said first temperature retains the high temperature phase but which transforms into an essentially banded martensite phase on cold working, and then deforming the article into a



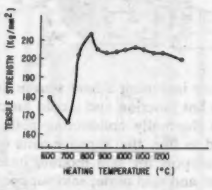
second shape by cold working, the temperatures and rate of cooling being such that, on reheating, the article at least partly resumes said first shape, said alloy comprising Fe-Mn, Fe-Mn-Co, Fe-Ni-Cr-Co, Fe-Mn-Cr-Co, Fe-Mn-Cr-Ni-Co, or another ternary or quaternary alloy containing Fe and at least one of the elements Mn, Ni and Cr.

3,989,553

PROCESS FOR PRODUCING MARAGING-STEEL CYLINDER FOR URANIUM ENRICHING CENTRIFUGAL SEPARATOR AND CYLINDERS PRODUCED THEREBY

Tsuguaki Oki, Kobe; Masatoshi Sudo, Akashi; Hiromori Tsutsumi, Nishinomiya; Koji Hosomi, Itami; Ichiro Tsukatani, Akashi, and Teruyuki Takahara, Osaka, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed July 29, 1974, Ser. No. 492,726
Claims priority, application Japan, July 27, 1973, 48-84774; Dec. 13, 1973, 48-139394
Int. Cl.² C21D 9/14
U.S. Cl. 148—12.3 14 Claims



1. A process for producing a maraging steel cylinder for a uranium enriching centrifugal separator, which comprises:

drawing a blank of a maraging steel into a cylindrical shape;

ironing said drawn blank until an ironing ratio of at least 20 percent is achieved; and

subjecting the cylinder thus ironed to aging.

3,989,554

COMPOSITE HARDFACING OF AIR HARDENING STEEL AND PARTICLES OF TUNGSTEN CARBIDE

Allen E. Wisler, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.

Continuation-in-part of Ser. No. 370,877, June 18, 1973, abandoned. This application Apr. 25, 1975, Ser. No. 571,447
Int. Cl.² C22B 38/04; E21C 13/00
U.S. Cl. 285—333 8 Claims

1. In a joint of drill pipe for rotary earth drilling having tool joint members on each end with threaded connections for connecting the joints with other joints of drill pipe, an improved hardfacing on the tool joint members comprising a

heterogeneous composite material consisting of sintered macroscopic tungsten carbide particles in an amount effective for abrasion resistance and consisting of microscopic carbides of tungsten in a binder selected from the class consisting of iron, nickel, cobalt, and combinations thereof, and an air hardening steel matrix consisting essentially of constituents with following proportions by weight:

carbon	0.40–0.70%
chromium	4.0–6.0
molybdenum	1.00–2.00%
vanadium	0.30–0.80%
iron	balance,

to form microscopic carbides of chromium, molybdenum and vanadium to support the macroscopic particles of sintered tungsten carbide.

3,989,555

NICKEL-IRON MATERIAL HAVING HIGH MAGNETIC PERMEABILITY

Tomoo Yamagishi, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 433,536, Jan. 15, 1974, abandoned. This application June 20, 1975, Ser. No. 588,891
Claims priority, application Japan, Apr. 11, 1973, 48-40361
Int. Cl.² C04B *35/00*
U.S. Cl. 148—31.55 **5 Claims**

1. A high magnetic permeability heat-treated and worked alloy for magnetic head cores, consisting essentially of

Element	% by Weight
Ni	75–82
Fe	5–24
Al	0.5–3.0
Nb	0.2–3.0
Ti	0.3–2.0

wherein said alloy is characterized by an initial permeability of at least 21,000, a Vicker's hardness of at least 180, and a coercive force (Hc) of up to 1.91.

3,989,556

SEMIHARD MAGNETIC ALLOY AND A PROCESS FOR THE PRODUCTION THEREOF

Masao Iwata, Chichibu, and Yoichi Ishijima, Konosu, both of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Mar. 21, 1975, Ser. No. 560,935
Int. Cl.² C04B *35/00*; C22C *38/18*
U.S. Cl. 148—31.55 **11 Claims**

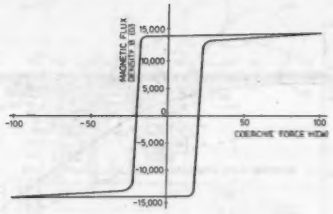
1. A heat-treated magnetic alloy having a residual magnetic flux density of 7,000 Gauss or more and a coersive force of 100 to 600 Oersted and consisting essentially of 17 to 45% by weight chromium, 3 to 14% by weight cobalt, 0.2 to 10% by weight titanium and a balance of substantially iron.

3,989,557

PROCESS OF PRODUCING SEMI-HARD MAGNETIC MATERIALS

Zenzo Henmi; Tatsuji Sasaki, both of Kawasaki; Makoto Kassai, and Masanori Okada, both of Yokohama, all of Japan, assignors to Fujitsu Ltd., Japan

Continuation-in-part of Ser. No. 511,370, Oct. 2, 1974, abandoned, which is a continuation-in-part of Ser. No. 279,320, Aug. 10, 1972, abandoned. This application July 3, 1975, Ser. No. 593,031
Claims priority, application Japan, June 1, 1972, 47-53814
Int. Cl.² H01F *1/00*
U.S. Cl. 148—120 **8 Claims**



1. A process of producing semi-hard magnetic materials having square hysteresis loop characteristics which comprises the steps of:

process annealing an alloy material consisting, by weight, of 73 to 93% cobalt, 1 to 5% niobium and the balance consisting essentially of iron, at a temperature of not lower than 900° C,

cold working said annealed alloy material at a reduction in area of not less than 75%; and

thereafter subjecting said cold worked alloy material to a combination treatment including one or more stress-relief annealings at a temperature of 500° to 700° C for a period of time not longer than 10 minutes selected so that no intermetallic compound precipitates in said alloy material, and one or more additional aging steps at a temperature of 600° to 900° C for a period of time not shorter than 30 minutes selected so that an intermetallic compound precipitates in said alloy material.

3,989,558
COATING AND DIFFUSION PROCESS FOR IMPROVING THE LIFE OF COBALT-BONDED SINTERED CARBIDE TOOLS

Brian Arthur Mynard, Bromsgrove; Bryan Jones; Victor Allen Tracey, both of Solihull, and Walter Betteridge, Kent, all of England, assignors to The International Nickel Company, Inc., New York, N.Y.

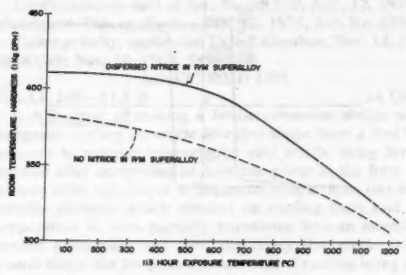
Continuation-in-part of Ser. No. 256,889, May 25, 1972, Pat. No. 3,785,783. This application Dec. 26, 1973, Ser. No. 428,107
Int. Cl.² B27F *3/00*
U.S. Cl. 148—126 **4 Claims**

1. A process of improving an article consisting essentially of metal carbide and a cobalt binder, and presenting one or more working surfaces subjected to wear in use, which comprises coating at least the working surface or surfaces of the article either prior to or subsequent to sintering with metal from the group of ruthenium and osmium and mixtures and alloys thereof, and causing diffusion between said coating metal and the cobalt to provide a sintered article having a surface layer containing less than 50% by weight of osmium and ruthenium based upon total of cobalt, osmium and ruthenium.

3,989,559
SUPERALLOYS CONTAINING NITRIDES AND PROCESS FOR PRODUCING SAME

Ching San Lin, Sayre, and James Thomas Smith, Towanda, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Division of Ser. No. 343,873, March 22, 1973, abandoned, which is a continuation of Ser. No. 146,198, March 24, 1971, abandoned. This application Oct. 10, 1974, Ser. No. 513,582
Int. Cl.² B22F *3/00*
U.S. Cl. 148—126 **3 Claims**


DISPERSED NITRIDE IN RVM SUPERALLOY
NO NITRIDE IN RVM SUPERALLOY
ROOM TEMPERATURE HARDNESS (1 kg DPH)
115 HOUR EXPOSURE TEMPERATURE (°C)

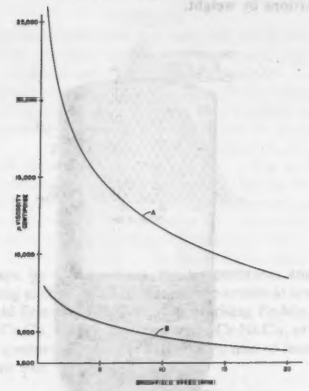
1. A process comprising:
a. providing an atmosphere containing at least 10% nitrogen and the balance an inert gas,
b. placing a superalloy powder containing from about 50% to about 75% by weight of nickel in said atmosphere,
c. maintaining said powder in said atmosphere and at a temperature of from about 700° C to about 950° C for at least about 3 hours and
d. cooling the resulting powder to below 700° C.

3,989,560
METHOD OF PREPARING GELLED MONOMETHYLHYDRAZINE

Barry D. Allan, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 3, 1966, Ser. No. 518,492
Int. Cl.² C06B *47/08*
U.S. Cl. 149—36 **1 Claim**

1. The method of converting liquid monomethylhydrazine to a thixotropic gel which comprises dispersing therein a sufficient amount of a gelling agent to produce a viscosity of at least 15,000 centipoise, said gelling agent being methyl cellulose containing 27.5 to 31.5 weight per cent methoxyl groups, hydroxypropyl methyl cellulose containing 28 to 30 weight per cent methoxyl groups and 7 to 12 weight per cent

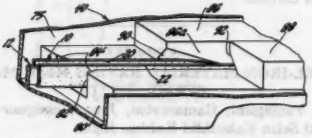


propoxyl groups, hydroxypropyl methyl cellulose containing 19 to 24 weight per cent methoxyl groups and 4 to 12 weight per cent propoxyl groups, dihydroxyethyl cellulose or hydroxypropyl cellulose containing about 4.6 propoxyl groups per glucose unit.

3,989,561
METHOD OF APPLYING A LAMINATED INSULATING FILM TO COPPER WIRE

Dale L. Cotton, La Grange, Ill., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 418,673, Nov. 23, 1973. This application May 19, 1975, Ser. No. 578,610
Int. Cl.² H01B *13/26*
U.S. Cl. 156—54 **4 Claims**



1. The method of continuously applying a thermally stable laminated insulating film, wherein one layer of said laminate is a fluorinated resin which resin will soften and flow at elevated temperatures onto a metal conductor comprising the steps of:
a. simultaneously feeding the metal conductor and the laminated film longitudinally and with the fluorinated resin side of the laminate adjacent the metal conductor into a guide means;
b. wrapping the film around the metal conductor in the guide means and with the adjacent side ends of the film being in an overlapping relationship to define a longitudinally extending seam;
c. heating the wrapped metal conductor in an inert atmosphere to a temperature of from about 700° to about 900° F. to cause the layer, adjacent the conductor, to soften and to flow into intimate contact with the surfaces of the conductor while maintaining the wrapped film in clamped engagement with the metal conductor;

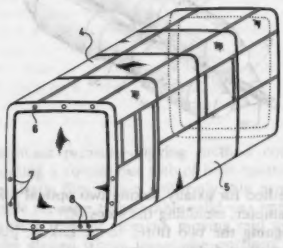
d. and thereafter cooling the wrapped conductor in an inert atmosphere to allow the layer adjacent the conductor to harden and bond the film to the metal conductor.

3,989,562

CONTAINER BODY

Oldrich Hladik; Vladimir Ort; Vladimir Pechar, all of Prague; Miroslav Mickulecky, Vysoke Myto; Ervin Zerzan, Brandys near Orl., and Bohumir Prebinda, Karvina, all of Czechoslovakia, assignors to PIKAZ, inzenyrsky podnik, Prague, Czechoslovakia

Filed Mar. 10, 1975, Ser. No. 556,722
Int. Cl.² B32B 5/20
U.S. Cl. 156—79 **7 Claims**



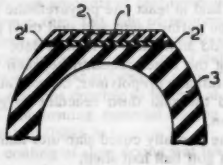
1. In a method of forming a closed container body which comprises the steps of winding a first plurality of layers of a fibrous, hardenable synthetic resin-impregnated material in criss-cross fashion to form a closed inner container boundary, winding a second plurality of layers of a fibrous, hardenable synthetic resin-impregnated material in criss-cross fashion in radial spaced relation to the inner container boundary to form a closed outer container boundary, arranging an insulating material in the space between the inner and outer container boundaries, and hardening the first and second plurality of layers, the improvement which comprises the steps of forming a pattern of radial ribs on the inner container boundary, and reinforcing the ribbed inner container boundary in a pattern defined by the ribs.

3,989,563

METHOD OF RETREADING TIRES

Wilhelm Schelkmann, Witten, Germany, assignor to Vakuum Vulk Holdings Ltd., Nassau, Bahamas

Division of Ser. No. 288,002, Sept. 11, 1972, Pat. No. 3,904,459. This application Mar. 12, 1975, Ser. No. 557,665
Claims priority, application Germany, Sept. 11, 1971, 2145574
The portion of the term of this patent subsequent to Sept. 9, 1992, has been disclaimed.
Int. Cl.² B29H 17/36, 17/37
U.S. Cl. 156—96 **18 Claims**



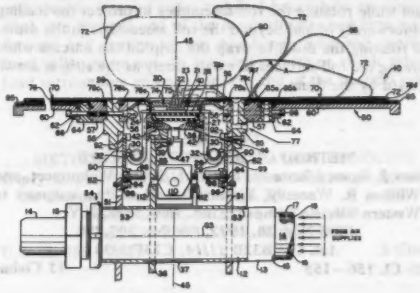
1. A method of retreading tires, comprising, in combination, the first step of positioning a tread strip in proximity to the outer periphery of a tire carcass; the second step of providing intermediate said carcass and said strip an unvulcanized adhesive bonding layer; the third step of effecting temporary adhesive bonding of said strip to said carcass by pressing said strip and said carcass together with a pressure sufficient to cause the material of said bonding layer to enter into and completely fill all the surface depressions in the facing surfaces of said strip and of said carcass and to completely fill the space intermediate the facing surfaces of said strip and of said carcass; and the fourth step of effecting permanent bonding of said tread strip to said carcass by effecting vulcanization of said bonding layer by heating, including effecting vulcanization of the marginal portions of said layer in advance of vulcanization of the central portion of said layer by providing intermediate said tread strip and said carcass a greater amount of vulcanization accelerator in the region of said marginal portions than in the region of said central portion and then heating the tire, so that the decrease in adhesive force of said central portion resulting during heating of the latter is delayed until after the vulcanization of said marginal portions has been substantially completed, whereby during the course of the vulcanization of the entire bonding layer the total adhesive force exerted by said layer will be sufficient to hold said tread strip in place on said carcass without the need for a holding wrapper or holding form.

3,989,564

BUILDING A CLOSED TORUS TIRE

John W. Touchette, Hartville, and Paul E. Appleby, Cuyahoga Falls, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 4, 1975, Ser. No. 601,968
Int. Cl.² B29H 17/10
U.S. Cl. 156—118 **17 Claims**



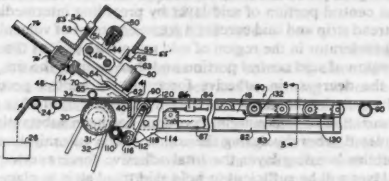
1. In a method of making a closed torus tire having a carcass formed of cord or wire wound continuously about a toroidal core of disintegrable material and a plurality of layers of elastomeric sheet material disposed to cover said cord or wire, and subsequently be cured, the improvement in said method comprising disposing a sheet of elastomeric tire building material in endless cylindrical form about a cylindrical tire building drum, disposing the core coaxially about the drum in radially spaced relation thereto, expanding the drum to press the axial mid-portion of the sheet to the core, then further expanding the lateral portions of the sheet adjacent to and axially outwardly of the mid-portion progressively about the core by expanding an inflatable member, and urging the respective lateral portions toward the core thereby causing said lateral portions to wrap further about the core and the respective axial edge portions of the sheet to flip over from said member to the core and subsequently disintegrating and removing the core from the tire.

3,989,565

TIRE BUILDING MACHINE SERVER

Paul E. Appleby, Cuyahoga Falls, and Michael W. Smith, Mogadore, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 26, 1975, Ser. No. 590,645
Int. Cl.² B29H 17/20
U.S. Cl. 156—133 9 Claims



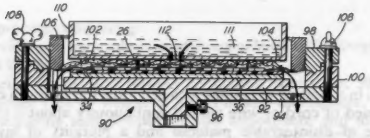
1. The method of building a tire, wherein a strip of uncured tire building material, particularly of tire sidewall material, is supported along its length to have its leading end adhered to a tire carcass on a tire building drum and then be wrapped around the drum, which method is characterized by advancing the strip lengthwise to place its leading end at an adjustably fixed line close to the drum while supporting the strip at closely spaced intervals by a plurality of roll assemblies whose roll surfaces are driven at a surface speed greater than the speed of the strip being so advanced, severing the strip from a running length supply thereof along a cutoff line spaced a fixed distance from the drum, then moving the plurality of roll assemblies forward relatively to the cutoff line and toward the drum while rotating the roll assemblies to project the leading end forwardly of and beyond the roll assemblies to the drum, and rotating the drum to wrap the strip on the carcass while allowing the roll surfaces to rotate freely as the strip is drawn forward by the drum.

3,989,566

METHOD OF HOLDING ARTICLES

James J. Egan, Allentown; Ronald I. Strohl, Walnutport, and William R. Wanesky, Wescosville, all of Pa., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Nov. 20, 1972, Ser. No. 307,898
Int. Cl.² B32B 31/14; C23F 1/00
U.S. Cl. 156—155 11 Claims



1. A method of holding an article on a substrate, which comprises the steps of:

a. selecting an article, having a desired characteristic from a group of articles;

b. placing the selected article on a coating of silicone resin on the substrate;

c. pressing the article against the silicone resin with a plastic screen;

d. dissolving unwanted material, while pressing the article against the silicone resin, to remove such material from the article; and

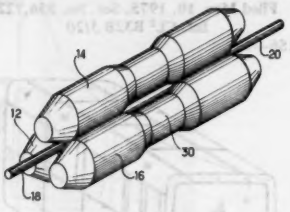
e. removing the plastic screen to leave the article held on the substrate by the silicone resin for further processing.

3,989,567

CONNECTION METHOD FOR TWO OPTICAL FIBERS HAVING THE SAME DIAMETER

Andre Tardy, St Germain Les Arpajon, France, assignor to Compagnie Generale d'Electricite, Paris Cedex, France

Filed June 17, 1975, Ser. No. 587,773
Claims priority, application France, June 20, 1974, 74.21506
Int. Cl.² B65H 69/06
U.S. Cl. 156—158 6 Claims



1. In a method for axially linking two optical fibres having the same diameter, including the steps of:

firstly, aligning the two fibres to be linked, placing their ends at a short distance from each other;

and forming a permanent and rigid link between these two ends; the improvement wherein said aligning step comprises; placing said fibres between cylindrical rods which are rigid bodies of revolution and holding and clamping these rods parallel to each other to form a central channel between the rods with the channel being limited by the lateral surfaces of the rods facing each other and inserting the two optical fibres to be linked together in line within said central channel with the ends of these two fibres next to each other in that channel.

3,989,568

POLYURETHANE COVERED GOLF BALLS

Edward J. Isaac, Westport, Mass., assignor to Acushnet Company, New Bedford, Mass.

Filed Nov. 21, 1974, Ser. No. 525,970
Int. Cl.² B32B 31/04
U.S. Cl. 156—182 7 Claims

1. A process for preparing a golf ball comprising a core and a cover surrounding said core, comprising at least one polyurethane prepolymer and at least one curing agent which will cure said prepolymer together with a third reactant selected from the group consisting of urethane prepolymers curable by said curing agent at a reaction rate different from the reaction rate of the curing agent with said at least one urethane prepolymer and curing agents which will cure said at least one urethane prepolymer at a different rate than the rate of cure of said at least one polyurethane prepolymer by said at least one curing agent comprising:

a. admixing said at least one polyurethane prepolymer said at least one curing agent and said third reactant;

b. pouring said admixture to form a slab;

c. permitting the faster reaction between the said at least one polyurethane prepolymer, the said at least one curing agent and the said third reactant to go to substantial completion;

d. cutting the partially cured slab into half shell blanks;

e. forming a golf ball half shell;

f. placing at least two of such golf ball half shells about a golf ball core; and

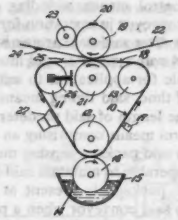
g. further curing said golf ball half shells about said golf ball core by effecting reaction of the slower reactants of said at least one polyurethane prepolymer, said at least one curing agent and said third reactant.

3,989,569

CONTINUOUS COPYING METHOD

Douglas A. Newman, Glen Cove, N.Y., assignor to Columbia Ribbon and Carbon Manufacturing Co., Inc., Glen Cove, N.Y.

Filed Feb. 10, 1975, Ser. No. 548,281
Int. Cl.² B41C *1/06*
U.S. Cl. 156—234 5 Claims



1. Continuous pressure-copying method comprising the steps of coating a continuous web of heat-resistant, memory-possessing plastic film with a uniformly thin original layer of heat-meltable pressure-transferable solid wax imaging composition to form a transfer element, moving said web to a pressure-transfer station where imagewise portions of said solid layer are pressure-transferred to a copy sheet under the effects of imaging pressure applied to said transfer element, and moving said used coated heat-resistant web to a recoating station where the used coating is heat-melted to a flowable condition, replaced with a fresh coating of identical imaging composition in a uniform thickness corresponding to the thickness of the original layer and is solidified prior to re-entry into the pressure-transfer station.

3,989,570

METHOD FOR PRODUCING AN IMPRINTING DEVICE

Joseph M. Orlando, Parsippany; Harry S. Katz, West Orange, and Jack W. Rainford, Closter, all of N.J., assignors to Precision Dynamics Corporation, Burbank, Calif.

Division of Ser. No. 385,659, Aug. 6, 1973, Pat. No. 3,867,164, which is a continuation of Ser. No. 225,648, Feb. 11, 1972, abandoned, which is a continuation of Ser. No. 854,700, Sept. 2, 1969, abandoned. This application Sept. 5, 1974, Ser. No. 503,263
Int. Cl.² B32B *27/40, 7/00, 27/20*
U.S. Cl. 156—239 6 Claims

1. In the production of a imprinting device comprising a frame member having a window therein, a thin film of impression conforming material secured across said window, and a coating of wet ink adhered to one surface of the film, the method comprising the steps of:

a. depositing a thin resinous film forming coating containing a resinous elastomer and diatomaceous earth filler having ink-absorbing and film flattening properties, said coating having sufficient amounts of said resinous elastomer and filler to form a thin, flat film of impression conforming material which is sufficiently thin and flexible to conform to the impressions and ridges of relief patterns, including fingerprints in a liquid solvent on a releasable web;

b. drying the resinous coating to form said thin flat film of impression conforming material having a thickness of about 0.0001 to 0.001 in.;

c. applying a coating of slow drying wet ink to the exposed surface of the releasable web supported film, so said ink remains wet but not wet enough to disturb the quality of the print;

d. removing the releasable web from the film; and

e. bonding the film to the frame member with the inked surface of the film facing through said window.

3,989,571

METHOD OF MAKING A SMOOTH TIPPED ENDOTRACHEAL TUBE

Andrew Harautuneian, Westlake Village, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Division of Ser. No. 353,244, April 23, 1973, Pat. No. 3,862,635. This application Nov. 18, 1974, Ser. No. 524,707
Int. Cl.² A61M *25/00*; B29C *17/10*; B32B *31/04, 31/18*
U.S. Cl. 156—250 10 Claims

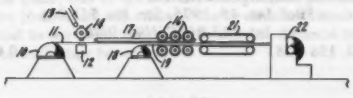
1. A method of making a smooth tipped medical tube comprising the steps of: forming a dual-lumen tube; separately forming an inflatable balloon with a permanently enlarged center portion, a forward collar section, and a rearward collar section; inserting the dual-lumen tube into a rear collar section, through the enlarged inflatable section and into the forward collar of the balloon; severing a forward portion of either one or both of the dual-lumen tube and the forward collar so the forward collar and dual-lumen tube are coterminous at a forward end of the medical tube; and forming the forward end portion of the dual-lumen tube and overlying front collar into a smooth, rounded lip with no visible ridge or joint surrounding an open forward end of the medical tube.

3,989,572

METHOD OF MAKING IRRIGATION CONDUITS

Henry D. Swartz, Chestnut Hill, Mass., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Dec. 15, 1975, Ser. No. 641,145
Int. Cl.² B32B *31/00*; B29C *19/02*
U.S. Cl. 156—252 5 Claims



1. A continuous method of making irrigation conduits comprising:

a. perforating a first sheet of plastic film with a perforating means repetitively forming rows of holes in the cross-machine direction;

b. positioning a fabric strip over the holes with a positioning means;

c. positioning a second sheet of plastic film under said first sheet;

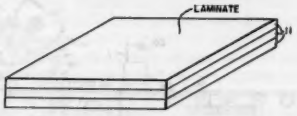
d. sealing the fabric and the sheets of plastic film together with a sealing means forming a plurality of continuous seals spaced apart a predetermined distance and running in the machine direction, thus forming a plurality of contiguous conduits; and

e. separating the individual conduits by slitting the seals.

3,989,573
GLASS-EPOXY LAMINATES FOR HIGH TEMPERATURE USE

Zal N. Sanjana, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 423,850, Dec. 11, 1973, Pat. No. 3,897,455. This application Apr. 24, 1975, Ser. No. 571,130
Int. Cl.² B32B *27/38, 17/04*
U.S. Cl. 156—330 **6 Claims**



1. A method of making a laminate comprising at least one layer of sheet material containing a cured resin comprising the steps of:

1. admixing at a temperature of up to about 50° C:

A. a mixture consisting essentially of:

a. liquid epoxy resin, selected from the group consisting of a diglycidyl ether of bisphenol A having a viscosity range of about 2,500 cps. to about 20,000 cps. at 25° C and polyglycidyl ethers of a novolac having a viscosity range of about 1,500 cps. to about 20,000 cps. at 52° C to 55° C and mixtures thereof, and

b. liquid NADIC methyl anhydride, with

B. solid benzophenone-tetracarboxylic dianhydride,

wherein the total anhydride plus dianhydride content is within the range of from about 0.60 to about 0.95 anhydride equivalents for each epoxy equivalent and the anhydride equivalent weight ratio of NADIC methyl anhydride: benzophenone-tetracarboxylic dianhydride is from about 0.50 to 0.90:1, to provide a homogeneous, stable dispersion of the solid dianhydride particles in the liquid without gellation, the dispersion containing about 98 percent to about 100 percent undissolved benzophenone-tetracarboxylic dianhydride;

2. adding organic solvent to the dispersion to give a solvent solution,

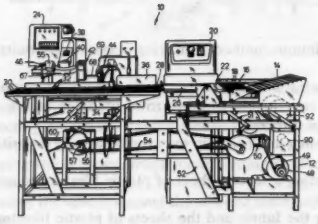
3. applying the solvent solution of the resinous admixture to a sheet material to coat or impregnate the material, and

4. curing the resin, to provide sheet material containing a solid resin.

3,989,574
AUTOMATIC LABEL APPLYING APPARATUS

Thomas S. Evans, Libertyville, Ill., assignor to Sturtevant Industries, Inc., Sturtevant, Wis.

Filed Jan. 15, 1975, Ser. No. 541,086
Int. Cl.² B65C *1/02, 9/40*
U.S. Cl. 156—351 **10 Claims**



1. In apparatus for applying labels to packages:

a label application station,

a conveyor operable to convey a package to said station,

drive means for driving said conveyor,

label application means for applying a label to said package after arrival at said station,

package sensing means for sensing when said package arrives at said station,

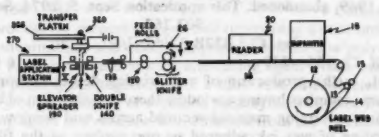
label sensing means for sensing whether a label is available to said label application means,

and control means for said drive means and responsive to said package sensing means and to said label sensing means, said control means including timing means to maintain said conveyor in operation for a predetermined interval of time after said package arrives at said station and to stop said conveyor after said interval of time if no label is available for application to said package during said interval of time, said timing means being adjustable for changing the length of said predetermined interval of time, said control means comprising an electrical control circuit wherein said package sensing means includes first switch means operable to maintain said conveyor in operation when no package is present at said station and tending to stop said conveyor when a package is present at said station, wherein said label sensing means includes second switch means in parallel with said first switch means and operable to maintain said conveyor in operation when a label is available and tending to stop said conveyor when no label is available, and wherein said timing means comprises a resistor and a capacitor forming an R/C circuit connected to said first and second switch means and operable to maintain said conveyor in operation for a predetermined interval of time during which said first and second switch means both tend to stop said conveyor, said resistor being a variable resistor and adjustable to change said predetermined interval of time.

3,989,575
SPLIT LABELING APPARATUS

John R. Davies, Grand Rapids, and Kornelis Platteschorre, Grandville, both of Mich., assignors to Oliver Machinery Company, Grand Rapids, Mich.

Filed Apr. 16, 1975, Ser. No. 568,505
Int. Cl.² B26D *5/00;* B32B *31/00*
U.S. Cl. 156—355 **15 Claims**



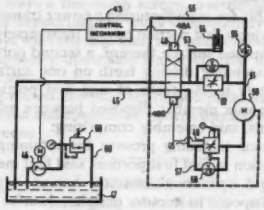
1. Split labeling apparatus comprising means for advancing an elongated double label web; divider means for slitting the advancing double label web longitudinally into a pair of like strips; label cut-off means downstream of said divider means for simultaneously cutting off a pair of like individual labels from said strips, one label being cut from each strip; and label transfer means for transferring said pair of individual cut labels from said cut-off means to a label application station whereby said individual labels are applied to articles to be labeled; said label transfer means including a pair of label separators and spreading means for spreading apart and changing the spacing between said separators and thus of said pair of individual labels cut from said strips whereby said labels are separated for transfer to the label application station.

3,989,576

APPARATUS FOR CONNECTING A FIRST WEB OF A WEB FORM MATERIAL, WHICH WEB UNWINDS FROM A FIRST ROLL, TO THE LEAD END OF A SECOND WEB OF A WEB-FORM MATERIAL, WHICH WEB UNWINDS FROM A SECOND ROLL

Heinrich Collin, Munich; Hans Mosburger, Weiherhammer; Gunther Lau, Katzwang, and Hermann Josef Brandl, Nurnberg, all of Germany, assignors to Bayerische Bert- Hutten- und Salzwerke AG, Munich, Germany

Filed June 17, 1974, Ser. No. 480,167
Claims priority, application Germany, June 18, 1973, 2330945
Int. Cl.² B65H 19/08
U.S. Cl. 156—361 11 Claims



1. In a device for connecting a first web of a web-shaped material unwinding from a first roll to the beginning of a second web of a web-shaped material unwinding from a second roll and having at least one transfer element and releasable engaging means for releasably coupling said second web to said transfer element, means for accelerating said transfer element to the speed of said first web and means for moving said transfer element to said first web to join said first and second webs, said transfer element engaging said first web and effecting a pressing of said beginning of said second web to said first web and adhesive means for connecting said first web to said beginning of said second web, the improvement comprising track means extending generally parallel with an exiting strand of said first web, carriage means movably mounted on said track means, said carriage means including a movable carriage, a guide roller rotatably mounted on said carriage for guiding said first web thereover and reversible drive means for alternately driving said carriage in both opposed directions along said track means, control means for controlling the speed of operation of said drive means and, consequently, the speed of movement of said carriage, said control means including measuring means for determining the existence of a pull load by said web on said carriage to effect a yielding by a carriage movement to an increased pull load on said web and a minimizing of pull load peaks and shock loads during initial acceleration of said second web, said control means further including an elongated bar having at least one surface of varying elevation and a substantially flat portion and valve means operatively connected to said elongated bar and responsive to said surface of said elongated bar to effect a control of said speed of operation of said drive means and, consequently, the speed of movement of said carriage at least in a direction of movement of said carriage away from an initial position thereof.

3,989,577

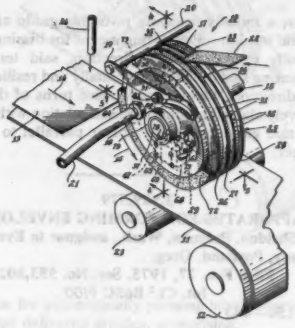
VARIABLE SPACING LABELER

Donald W. Watson, Arlington Heights, Ill., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 15, 1974, Ser. No. 524,093
Int. Cl.² B65C 9/42; B65H 5/22
U.S. Cl. 156—364 7 Claims

1. A system for automatically pressing labels bearing information against delivered articles, comprising:

a. an article transport;
b. means for detecting the presence of articles delivered to the transport at a detection station;
c. means for feeding labels in response to the detection of said articles;
d. a rotary power source;
e. a vacuum source;
f. a label transfer wheel, coupled to the power source and driven thereby at a uniform speed, for pressing without substantial sliding each of the labels from the feeding means against a different one of the articles placed on the transport, the instantaneous angular position of the wheel being independent of the location of articles on the transport, the transfer wheel including: a cylindrical structure having an annular cavity axially extending into a side thereof and a plurality of holes disposed about the cylindrical surface of the structure, said holes radially commu-



nicating with the cavity; and means rotatably coupled to the structure for providing from the cavity a chamber with a port, at least one of the holes communicating with the chamber and said port being coupled to the vacuum source whereby as the cylindrical structure is rotated with respect to the means providing the chamber vacuum pressure is periodically applied to the holes; and

wherein said means for providing a chamber includes: a plate rotatably coupled to the structure; an annular seal for providing a fluid tight seal between the plate and the structure; a first device, coupled to the plate, for providing a fluid tight radial wall in the cavity; and a second device, coupled to the plate, for providing another fluid tight radial wall in the cavity, said port being located in the plate, one of the devices being securely fastened to the plate while the other of the devices is rotatably coupled to the plate, whereby the angular distance between the walls may be varied.

3,989,578

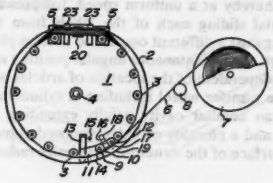
APPARATUS FOR MANUFACTURING OPTICAL FIBER BUNDLE

Nobuyoshi Hashimoto, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 271,041, July 12, 1972, abandoned. This application July 18, 1974, Ser. No. 489,622
Claims priority, application Japan, July 14, 1971, 46-51811; July 14, 1971, 46-51812
Int. Cl.² B65H 81/00
U.S. Cl. 156—433 5 Claims

1. An apparatus for manufacturing an optical fiber bundle, comprising a disc-shaped reel having a rotational axis and provided along its periphery with a plurality of rollers projecting parallel to said rotational axis and around which an endless optical fiber is wound, a pair of radially extending spaced grooved guide frames secured at their lower closed ends to the

peripheral edge of said reel, forming radially extending grooves each having an inner wall and elongated in the guiding direction and having a width which is at least substantially equal to the diameter of a continuous extremely thin optical fiber to be wound on said reel, a pair of radially extending tension bars near said guide frames for urging said optical fiber against said inner walls, one of said rollers being a tension roller, a radially inwardly pivotable guide arm for supporting said tension roller, spring means for biasing said guide arm radially in an outward direction, said tension roller thereby biasing said optical fiber radially and resiliently in said outward direction, whereby successive turns of the fiber are progressively aligned in superimposed relation with each other between said guide frames in a plane parrallel to the surface of said reel.



3,989,579

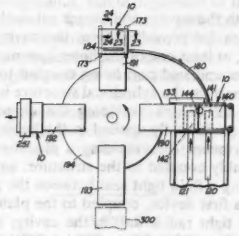
APPARATUS FOR FORMING ENVELOPES

Gary L. Sheldon, Pullman, Wash., assignor to Evans Products Company, Portland, Oreg.

Filed Feb. 27, 1975, Ser. No. 553,802

Int. Cl.[2] B65C 9/00

U.S. Cl. 156—443 **4 Claims**



1. An apparatus for forming envelopes of thermoplastic sheets comprising;

a. conveyor means for conveying said sheets individually along a path from a loading station to a transfer station;

b. feeding means for supplying individual sheets to said conveyor means at said loading station;

c. sealing means;

d. an elliptically-shaped curved rod extending from said transfer station to said sealing means;

e. transfer means comprising;

1. a turntable,

2. a plurality of relatively flat pickup arms having an upper and lower surface lying in a horizontal plane attached to said turntable, said pickup arms having a plurality of openings on the lower surface thereof communicating the outside of said arm with a vacuum source, and

3. means for moving said turntable about its axis in a horizontal plane at predetermined intervals for a predetermined distance, said transfer means being located relative to said transfer station, sealing means and curved rod such that when one of said pickup arms is adjacent a sheet at said transfer station, another of said pickup arms is at said sealing means, and during traverse of one of said pickup arms from said transfer station to said sealing station, a sheet carried thereby is moved against said curved rod whereby it is folded into an envelope about said arm and presented in sealing relationship to said sealing means.

3,989,580

ASSEMBLY FOR MAKING A POWER TRANSMISSION BELT

Ronald D. Hoback, and Joseph C. Geist, both of Lincoln, Nebr., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 337,056, March 1, 1973, Pat. No. 3,897,291. This application Mar. 24, 1975, Ser. No. 561,385

Int. Cl.[2] B29H 7/22; B32B 5/22, 25/10

U.S. Cl. 156—443 **12 Claims**

1. An assembly for manufacturing a power transmission belt of the type having a first portion having transversely extending driving teeth on one surface thereof, a second portion having transversely extending driving teeth on one surface thereof facing oppositely to the teeth of said first portion, and an inextensible tensile member disposed between said first and second portions, said assembly comprising:

A. first means including grooves for retaining the tooth configuration in said first portion, said first means including a rigid cylindrical mandrel having a plurality of grooves disposed in its outer peripheral surface extending axially thereof;

B. second means including grooves for retaining the tooth configuration in said second portion, said second means including a flexible matrix associated with said mandrel, said matrix having a plurality of teeth disposed in outer rows at each axial end thereof with each tooth extending axially on one surface thereof and a plurality of alternating lands and grooves extending axially between said outer rows of teeth and facing inwardly of the mandrel and said teeth protruding radially inwardly beyond the surface of said lands;

C. means for positioning said first portion relative to said second portion such that the grooves in said first means are arranged in a predetermined position relative to the grooves in said second means.

3,989,581

APPARATUS FOR PRODUCING BOARDS OF FILAMENTARY MATERIAL

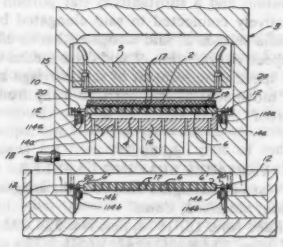
Harald Kober, Wanne-Eickel, and Eduard J. C. Huydts, Dusseldorf-Gerresheim, both of Germany, assignors to G. Siempelkamp & Co., Krefeld, Germany

Continuation of Ser. No. 381,436, July 23, 1973, abandoned. This application June 10, 1975, Ser. No. 585,507

Claims priority, application Germany, July 27, 1972, 2236895

Int. Cl.[2] B32B 31/00

U.S. Cl. 156—510 **5 Claims**



1. An apparatus for producing boards of filamentary material, comprising:

a press including a stationary perforated lower platen and a vertically reciprocable upper platen spacedly overlying said lower platen;

conveyor means including a series of perforated trays passing through the gap between said platens;

loading means upstream of said press for depositing oversized mats of filamentary material, permeated by a wet hydraulic binder, on said trays for compaction between said platens;

die means on said upper platen forming a sharp-edged rectangular frame for trimming the edges of said oversized mats during compaction, said trays being provided with a rabbet forming a stop for said frame and defining a complementary anvil for said die means bounded by a rectangular shoulder conforming to said frame;

supply means upstream of said loading means for delivering to said trays a fine-mesh screen, overhanging said shoudler, for supporting the mats subsequently deposited on said trays whereby said mats and said screens are trimmed simultaneously upon said frame coming to rest on said rabbet; and

unloading means downstream of said press for the removal of trimmed and compacted boards formed from said mats and screens.

3,989,582

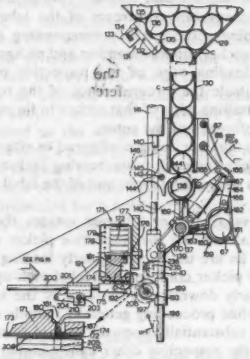
WINDING APPARATUS

Leslie Salgo, Pickering, Canada, assignor to Imperial Oil Limited, Toronto, Canada

Division of Ser. No. 288,074, Sept. 11, 1972, Pat. No. 3,908,923. This application Feb. 14, 1975, Ser. No. 549,881

Int. Cl.² B65C 9/18

U.S. Cl. 156—542 **10 Claims**



1. Means for feeding a tab or the like from a pick-up position to an applying position comprising a pivotally mounted picker head movable between said pick up and applying positions and having a tab carrying face, to be presented at said positions, means for feeding tabs on a carrier web to said pickup position, means for applying vacuum to said tab carrying face at said pick up position to effect pick up of a tab on said carrier web, for maintaining said vacuum at said face during picker head movement between said pick up and applying positions to hold a picked up tab on said face during such movement, for releasing said vacuum at said face at said applying and for applying a positive air jet through said face at said applying station to deliver a tab held on said face away from said face under positive air pressure, air jet means disposed in opposed relation to said tab carrying face with said picker head at said pick up position to direct an air jet perpendicularly towards said pick up face against the back of a tab being picked up to drive the tab through a hole in said carrier web while against said face while vacuum is applied thereto, and means for moving said picker head between said pick up and applying positions.

3,989,583

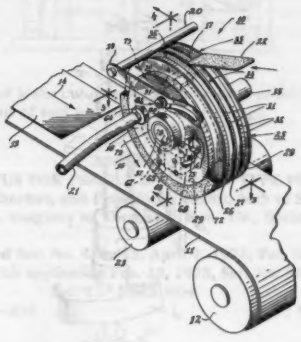
VARIABLE RATE LABELING SYSTEM

Donald W. Watson, Arlington Heights, Ill., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 15, 1974, Ser. No. 524,100

Int. Cl.² B65C 9/08; B65H 5/22

U.S. Cl. 156—568 **7 Claims**



1. A system for automatically pressing labels bearing information against delivered articles, comprising:

a. an article transport;

b. means for placing articles on the transport at a periodic rate;

c. a source of labels, the source providing labels at said periodic rate;

d. a rotary power source;

e. a vacuum source;

e. a label transfer wheel, coupled to the power source and continuously rotatable thereby at a constant speed, for pressing without substantial sliding each of the labels from said label source against a different one of the articles, the instantaneous angular position of the wheel being independent of the location of articles on the transport, the rotation rate of the transfer wheel and said periodic rate being relatively variable, whereby information on the labels is applied to the articles, the transfer wheel including: a cylindrical structure having an annular cavity axially extending into a side thereof and a plurality of holes disposed about the cylindrical surface of the structure, said holes radially communicating with the cavity; and means rotatable coupled to the structure for providing from the cavity a chamber with a port, at least one of the holes communicating with the chamber and said port being coupled to the vacuum source whereby as the cylindrical structure is rotated with respect to the means providing the chamber vacuum pressure is periodically applied to the holes; and

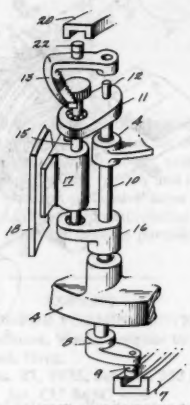
wherein said means for providing a chamber includes: a plate rotatably coupled to the structure; an annular seal for providing a fluid tight seal between the plate and the structure; a first device, coupled to the plate, for providing a fluid tight radial wall in the cavity; and a second device, coupled to the plate, for providing another fluid tight radial wall in the cavity, said port being located in the plate, one of the devices being securely fastened to the plate while the other of the devices is rotatably coupled to the plate, whereby the angular distance between the walls may be varied.

3,989,584

LABEL PICK-UP MECHANISM

Masuho Yamada, Toyoake, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 3, 1975, Ser. No. 564,831
Claims priority, application Japan, Apr. 11, 1974, 49-40703
Int. Cl.[2] B65C 9/08
U.S. Cl. 156—571 1 Claim



1. A label pick-up mechanism, comprising:

a rotor adapted to be rotationally driven in one angular sense about a generally vertical longitudinal axis of rotation;

an upper cam member above the rotor;

a lower cam member below the rotor;

a label magazine disposed radially outside the circumference of the rotor and provided with a radially inwardly facing label pick-up opening at the radially inner end thereof through which the foremost one of a generally stack of labels is accessable for pick-up;

a plurality of pickers, each having an arcuate, radially outer surface that is generally cylindrically curved about the rotation axis of the rotor, the pickers being arranged in a generally circular series about the circumference of the rotor;

a first generally vertical shaft for each picker;

a picker support member for each picker,

the respective picker support members being mounted on the respective first shafts and mounting the respective pickers, thereby disposing the respective pickers beside the respective first shafts;

a plurality of second generally vertical shafts, one for the each picker;

the second shafts being arranged in a circular array supported on said rotor between the rotation axis of the rotor and the circumference of the rotor

means journalling the second shafts with respect to the rotor for rotation of each second shaft about its own longitudinal axis;

a first plurality of can followers disposed to follow one of said cam members, there being one first cam follower for each said second shaft;

a first crank-like lever for each first cam follower, each first lever connecting a respective first cam follower to a respective second shaft;

second crank-like lever means mounted on each said second shaft for angular movement therewith about the longitudinal axis of the respective second shaft;

bearing means on each second level means journalling a respective first shaft laterally beside a respective second shaft for angular movement about the longitudinal axis of the respective first shaft;

a plurality of sector gears, one for each picker, each sector gear being pivotally mounted on a respective second shaft for rotation about said respective second shaft;

a second plurality of cam follower disposed to follow the other of said cam members;

each said second cam follower being mounted on a respective one of said sector gears;

a plurality of pinion gears, one mounted on each respective first shaft in meshing relation with a respective sector gear;

a pasting roll with means supplying paste thereon;

means mounting the pasting roll generally vertically for rotation about the longitudinal axis thereof with the surface thereof tangent along a generally vertical line to the circumference of the rotor, at a pasting station disposed angularly upstream of the label magazine, so that as the rotor is rotated about the rotation axis thereof, the pasting roll makes line contact with each picker in succession and rolls a layer of paste thereon from the angularly leading edge to the angularly trailing edge of each picker as each picker passes through the pasting station;

said other cam member being configured to affect each paste-bearing picker as each paste-bearing picker approaches the radially inner end of the label magazine as follows:

the respective second cam follower rotates the respective sector gear angularly upstream of the label magazine, corresponding rotating the corresponding pinion gear, first shaft, picker support member and picker causing the angularly leading edge of the respective picker to lie radially outside the circumference of the rotor and the angularly trailing edge of that picker to lie radially inside the circumference of the rotor;

said one cam member being configured to affect each paste bearing picker as each paste bearing picker approaches and passes the radially inner end of the label magazine as follows:

the respective first cam follower rotates the respective second shaft moving the respective picker radially outwardly in an arc until the angularly leading edge of the respective picker confronts the label pick-up opening at the angularly downstream extreme of the label pick-up opening while proceeding generally radially outwardly of the rotor, substantially normally to said opening;

whereupon the respective other cam member permits the respective pasted picker to rock across the foremost label accessable through said pick-up opening;

said one cam member being further configured to affect each picker as each picker angularly trailing edge rocks into contact with the angularly trailing edge of said foremost label at the radially inner end of the label magazine as follows:

the respective first cam follower rotates the respective second shaft moving the respective picker radially inwardly in an arc withdrawing the angularly trailing edge of the respective picker substantially normally away from the angularly trailing extreme of the label pick-up opening; and

said other cam member being further configured to affect each picker upon each picker being withdrawn, as follows:

the respective second cam follower rotates the respective sector gear correspondingly rotating the corresponding pinion gear, first shaft, picker support member and picker causing the picker to resume alignment with the circumference of the rotor.

3,989,585

SYNERGISTIC COMPOSITIONS CONTAINING α-BROMO-p-METHYLACETOPHENONE AND BIS(TRICHLOROMETHYL) SULFONE AND THEIR USE AS SLIMICIDES

Paul Swered, Philadelphia, and Daniel B. Ellis, Huntingdon Valley, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed Oct. 23, 1975, Ser. No. 625,284
Int. Cl.² D21D 3/00
U.S. Cl. 162—161 8 Claims

1. A composition for the control of the microorganism *Klebsiella pneumoniae* in aqueous systems comprising α-Bromo-p-methylacetophenone and Bis (trichloromethyl) sulfone, wherein the weight ratio of the acetophenone to the sulfone ranges from about 95:5 to about 5:95.

3,989,586

ABSORBENT PAPER PRODUCTS AND METHOD OF PREPARATION

Robert N. Bashaw; Bobby L. Atkins, and James R. Gross, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 359,589, May 11, 1973, abandoned. This application Apr. 18, 1975, Ser. No. 569,433
Int. Cl.² D21D 3/00
U.S. Cl. 162—168 N 10 Claims

1. A method for producing a sorptive paper product containing a water-insoluble, water-swellable copolymer which comprises the steps of forming a dispersion of a finely divided copolymer of maleic anhydride with styrene, ethylene, propylene, butylene or isobutylene, cross-linked with from about 0.001 to about 0.05 mole of a polyunsaturated cross-linking agent per mole of maleic anhydride in the copolymer, in an aqueous solution of a synthetic surfactant, incorporating said dispersion in an aqueous suspension of cellulosic pulp to provide from about 3 to about 25 percent by weight of said copolymer based on the weight of cellulosic material in the suspension, forming a paper product from the resulting mixed suspension, drying said product and exposing the dried product to the action of ammonia or an alcoholic solution of an alkali metal hydroxide for a predetermined period to convert the copolymer to the water-swellable salt form.

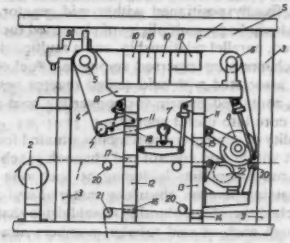
3,989,587

SYSTEM FOR INSTALLING ENDLESS BELTS IN A MACHINE FOR MAKING MULTIPLE-PLY PAPER PRODUCTS

Udo Grossmann, Heidenheim (Brenz), Germany, assignor to J. M. Voith GmbH, Heidenheim, Germany

Continuation of Ser. No. 442,139, Feb. 13, 1974, abandoned. This application Sept. 15, 1975, Ser. No. 613,306
Claims priority, application Germany, Feb. 17, 1973, 2307848
Int. Cl.² D21F 9/02
U.S. Cl. 162—200 3 Claims

3. A method of installing an endless belt-shaped element in a paper-making machine, comprising the steps of opening normally closed upper and lower cut-outs formed in a set of upright support members which are located at one side of the machine, the cut-outs extending all the way through these support members and being located opposite the free axial ends of rollers which are cantilevered from a set of additional upright support members located at the opposite side of the machine; slipping the lower run of an endless belt-shaped web element through the opened lower cut-outs and the upper run of the same web element through the opened upper cut-outs, and via said free axial ends onto said rollers; and re-closing



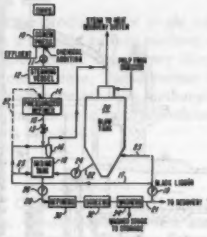
said upper and lower cut-outs to prevent escape of said upper and lower runs of said web element therethrough.

3,989,588

APPARATUS FOR PRODUCING KRAFT TYPE PULP

Michael T. Charters, and Franklin F. Landis, both of Springfield, Ohio, assignors to The Bauer Bros. Co., Springfield, Ohio

Division of Ser. No. 456,455, April 1, 1974, Pat. No. 3,873,412. This application Feb. 10, 1975, Ser. No. 548,288
Int. Cl.² B32B 9/04
U.S. Cl. 162—234 12 Claims



1. Apparatus for producing a pulp suited for use in the manufacture of kraft type products comprising means for receiving and elevating the temperature of segments of fibrous material, pressurized refiner means connected to receive said material the temperature of which has been elevated, said pressurized refiner means embodying means to reduce said material to individual fibers and fiber bundles, means for providing a hot kraft pulp, means for effecting an intermingling of said individual fibers and fiber bundles and said hot kraft pulp and means for applying hot black liquor to the fibers and fiber bundles and said hot kraft pulp to produce in the intermingling thereof a composite pulp mixture especially suited for kraft type products.

3,989,589

HYDRAULIC DRIVE FOR CONTROL RODS

Erling Frisch, deceased, late of Pittsburgh, Pa., by Dorothy Randall Frisch, administratrix, and Harry N. Andrews, Franklin Township, Westmoreland County, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 6, 1973, Ser. No. 367,621
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² G21C 7/08
U.S. Cl. 176—36 R 11 Claims

1. A nuclear reactor comprising,
a sealed, pressurized, reactor vessel having a plurality of openings in a wall thereof, each opening having a tubular

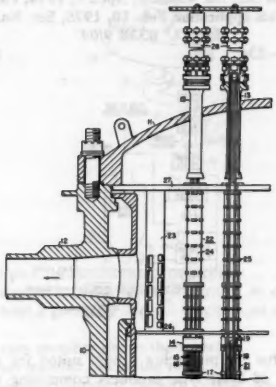
member extending therethrough and sealingly attached thereto, the interior of said tubular member being exposed to the interior of said vessel,

a core fixedly positioned within said reactor vessel, said core including a multiplicity of elongated fuel elements in spaced, parallel relationship, and a multiplicity of control rod channels interspersed among said fuel elements,

means associated with said sealed reactor vessel and said core contained therein for converting heat produced by said core into useful energy,

a plurality of control rod assemblies situated for axial movement within said control rod channels, each of said control rod assemblies including at least one control rod containing neutron absorbing material and a drive shaft attached thereto, a plurality of said drive shafts extending through each of said tubular members attached to said reactor vessel,

sealed hollow hydraulic drive means sealingly attached to each of said tubular members for individually moving said drive shafts, and thereby said at least one control rod associated therewith, into and out of said core, said drive means having the interior thereof exposed to the interior of said tubular members, respectively, said drive means including a plurality of cylinders comprising cylindrical



channels for respective movement therein of said control rod drive shafts, said plurality of cylinders being located within said drive means, and latching apparatus entirely within said drive means for positively and mechanically holding individual drive shafts of control rods in a withdrawn position, the ends of said drive shafts terminating within said drive means,

said latching apparatus including complementary engaging members one mounted on said drive shaft and movable to engage another engaging member mounted entirely within said drive means, said other engaging member including an elongated arm of magnetic material mounted pivotally against a resilient means and biased toward said one engaging member when the control rod associated with said one engaging member is in a withdrawn position, and actuating means for said latching apparatus positioned adjacent said latching apparatus and located on the exterior of said drive means,

said actuating means including electromagnetic pole means positioned in alignment with the elongated arm of said other engaging member to move said arm pivotally against said resilient means and away from said one engaging member when said electromagnetic pole means is energized.

3,989,590

PRESSURIZED FUEL ELEMENTS FOR NUCLEAR REACTORS

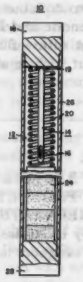
Henry A. Wehrli, III, Monroeville; Edmond E. DeMario, and Thomas R. Hovanec, both of Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 11, 1973, Ser. No. 396,164

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.[2] G21C *3/04*

U.S. Cl. 176—68 **9 Claims**



1. A clad nuclear fuel element comprising an elongated hermetically sealed casing member, nuclear fuel occupying a portion of the interior of said casing member and the remainder of said casing member forming a gas filled plenum pressurized during manufacture with a predetermined volume of gas, at least one hermetically sealed elongated capsule having no extraneous internal support within the capsule, occupying at least a portion of the interior of said plenum out of contact with the casing member, said capsule formed with a depression in a wall of the capsule extending substantially less than the longitudinal dimension thereof, the depression controlling collapse of the capsule in a predetermined manner in a buckling mode, proportionally linearly with increases in gas generation that would result in an increase in pressure above a given designed level within said plenum due to fission gas accumulation generated under irradiation if the capsule did not collapse in a buckling mode, to provide additional volume in said plenum resulting from collapse of the capsule to the extent necessary to accommodate the increase in gas volume to maintain the pressure within said plenum substantially constant throughout the operation of the fuel element under irradiation.

3,989,591

TEST METHOD FOR SEPARATING AND/OR ISOLATING BACTERIA AND TISSUE CELLS

Lance A. Liotta, 14004 Mont Ave., East Cleveland, Ohio 44112

Continuation of Ser. No. 323,864, Jan. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 62,810, Aug. 11, 1970, abandoned. This application Sept. 3, 1974, Ser. No. 502,843

Int. Cl.[2] C12K *1/04, 9/00;* **G01N** *1/00*

U.S. Cl. 195—1.8 **8 Claims**

1. A method of isolating bacteria or tissue cells comprising the steps of:

a. providing an expandable member which can be expanded in at least one dimension having an upper surface;

b. obtaining a sample of the bacteria or tissue cells to be isolated;

c. placing at least a portion of said sample of bacteria or tissue cells on said surface;

d. thereafter expanding said surface in at least one dimension an amount sufficient to cause individual components

in said sample of bacteria or tissue cells to be moved a finite distance apart; and

e. evaluating the bacteria or tissue cells so obtained.

3,989,592

WATER-SOLUBLE POLYMERS AND UTILIZATION THEREOF

Richard Irwin Leavitt, Lower Makefield Township, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 23, 1973, Ser. No. 418,489

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 13, 1976

Int. Cl.² C12D *13/06*

U.S. Cl. 195—29 11 Claims

1. A process for manufacturing watersoluble polymers that thicken reversibly in aqueous solution on adjustment of the degree of alkalinity, which comprises contacting, under conversion conditions, an aqueous suspension of a water-dispersible protein with the extracellular enzymes formed by the microorganism *Pseudomonas fabricans* No. 492 (A.T.C.C. No.21984), said enzymes being in an amount effective to produce said reversible thickening.

3,989,593

N-DEMETHYLATION OF INDOLE ALKALOIDS BY *S. ALBOGRISEOLUS*

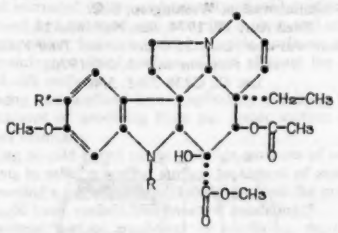
Donald R. Brannon, Pittsboro, and Norbert Neuss, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Sept. 19, 1973, Ser. No. 398,724

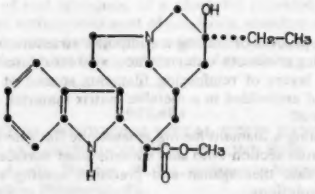
Int. Cl.² C12B *1/00*

U.S. Cl. 195—29 3 Claims

1. The process which comprises fermenting with *S. albogriseolus* in submerged culture fermenation a compound of the structure



wherein R is methyl and R′ is hydrogen or



to produce an N-demethylated compound in which R is hydrogen and R′ has the same meaning as hereinabove and then isolating said N-demthylated compound from the fermentation medium.

3,989,594

MICROBIOLOGICAL PRODUCTION OF PROTEIN

David Graham MacLennan; John Clark Ousby; Terence Robert Owen, and David Charles Steer, all of Stockton-on-Tees, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 203,061, Nov. 29, 1971, abandoned. This application Nov. 15, 1973, Ser. No. 416,098

Claims priority, application United Kingdom, Dec. 9, 1970, 58466; Aug. 19, 1971, 38938

Int. Cl.² C12B *1/00*

U.S. Cl. 195—49 9 Claims

1. A process for the microbiological production of a protein composition as the essential product which comprises aerobically culturing bacteria belonging to at least one methanol-utilizing strain of a species selected from the group consisting of Pseudomonas methylotropha, and Pseudomonas rosea, in an aqueous culture medium comprising methanol as a source of assimilable carbon and inorganic nutrients to produce said protein composition and recovering the protein composition so produced.

3,989,595

PRODUCTION OF SINGLE CELL PROTEIN

Richard Isaac Mateles, Jabotinsky 28; Israel Goldberg, Buria 26, both of Jerusalem, and Emil Battat, Halperin 3, Herzliya, all of Israel

Filed Aug. 29, 1975, Ser. No. 609,164

Claims priority, application Israel, Sept. 3, 1974, 45587

Int. Cl.² C12D *13/06*

U.S. Cl. 195—49 5 Claims

1. A process for the production of single cell protein comprising growing on a suitable culture medium which contains from 2.5 to 200 micrograms copper per liter, calculated as metal, by continuous culture, Pseudomonas C, there being used as sole carbon source methanol, methanol and formaldehyde, or methanol and formate, until a predetermined crop of single cell protein is obtained.

3,989,596

AGGREGATE OF DRIED FLOCCULATED CELLS

Margaret E. Long, Winston-Salem, N.C., assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Division of Ser. No. 455,696, March 28, 1974, abandoned, which is a division of Ser. No. 161,337, July 9, 1971, Pat. No. 3,821,086. This application Oct. 14, 1975, Ser. No. 621,995

The portion of the term of this patent subsequent to June 28, 1991, has been disclaimed.

Int. Cl.² C12B *1/26;* C12K *1/10*

U.S. Cl. 195—56 22 Claims

1. An enzyme-containing aggregate capable of effecting enzymatic transformation of a substrate contacted therewith comprising microbial cells having said enzyme associated therewith flocculated with at least one percent by weight based on the wet weight of said cells of a synthetic polyelectrolyte flocculating agent wherein said aggregate is dried and said agent is selected from the group consisting of anionic and cationic polyelectrolytes.

3,989,597

AGGREGATE OF FLOCCULATED CELLS

Chin K. Lee, and Margaret E. Long, both of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Division of Ser. No. 455,696, March 28, 1974, abandoned, which is a division of Ser. No. 161,337, July 9, 1971, Pat. No. 3,821,086. This application Oct. 14, 1975, Ser. No. 621,996

Int. Cl.² C12B *1/26;* C12K *1/10*

U.S. Cl. 195—56 8 Claims

1. An enzyme-containing aggregate capable of effecting enzymatic transformation of a substrate contacted therewith comprising microbial cells having said enzyme associated

therewith flocculated with at least one percent by weight based on the wet weight of said cells of a synthetic polyelectrolyte flocculating agent wherein said aggregate is frozen and said agent is selected from the group consisting of anionic and cationic polyelectrolytes.

3,989,598

ANTIBIOTIC DAUNORUBICIN AND ITS PREPARATION

Sylvie Pinnert, Beaulieu-sur-Mer; Leon Ninet, and Jean Preud'Homme, both of Paris, all of France, assignors to Rhone-Poulenc S.A., Paris, France

Continuation-in-part of Ser. No. 280,816, May 16, 1963. This application Nov. 21, 1968, Ser. No. 777,876

Claims priority, application France, May 18, 1962, 62.898076

Int. Cl.[2] C12D *9/14*

U.S. Cl. 195—80 R 5 Claims

1. Process for the production of daunorubicin, which comprises cultivating aerobically by the submerged culture technique a microorganism selected from the class consisting of Streptomyces coeruleorubidus, NRRL 3045 and 3046, in a liquid nutrient medium, of initial pH 6.0 to 7.8 and at 23° to 35° C., containing assimilable sources of carbon, nitrogen, and mineral salts with an aeration rate of 0.3 to 2 liters of sterile air per minute per liter of medium until substantial antibiotic activity is produced by the said microorganism in the said medium, recovering an orange-red antibiotic mixture containing daunorubicin from the medium, and isolating daunorubicin from the said orange-red antibiotic mixture.

3,989,599

PROCESS AND APPARATUS FOR LIQUID AND GAS SEPARATION

Duncan C. Bull, and Gerald L. Solomons, both of High Wycombe, England, assignors to Ranks Hovis McDougall Limited, London, England

Filed Aug. 16, 1974, Ser. No. 497,941

Claims priority, application United Kingdom, Aug. 22, 1973, 39765/73

Int. Cl.[2] C12B *1/00*

U.S. Cl. 195—105 9 Claims

1. A continuous separator for liquid and gas for obtaining a fermentation product from a continuous fermenter by way of the separator, comprising:

a cyclone separator chamber having an inlet from the fermenter in the upper portion of the chamber;

a liquid outlet in the lower portion of the chamber, the outlet having aseptic lock means comprising a liquid outlet valve and control means responsive to a liquid parameter for maintaining the separated liquid above a minimum level above the valve to prevent passage of separated gas and a heating device having a releasable closure and means to feed steam in through the liquid outlet for sterilizing the separator and after release of the closure to be used as an aseptic lock means;

a gas outlet in the upper portion of the chamber having aseptic lock means.

3,989,600

DISTILLING H_2O FROM AROMATIC CARBOXYLIC ACID AT A PH EXCEEDING 9

Satoshi Takahashi; Tomio Harada; Koshi Namie, all of Matsuyama; Hiroshi Shirahige, Ehime, and Masayuki Sakurai, Matsuyama, all of Japan, assignors to Teijin Hercules Chemical Co., Ltd., Tokyo, Japan

Filed Dec. 23, 1974, Ser. No. 534,905

Claims priority, application Japan, Dec. 26, 1973, 48-144039

Int. Cl.[2] B01D *3/00*

U.S. Cl. 203—15 10 Claims

1. In the process for preparing an aromatic carboxylic acid selected from benzoic acid, p-toluic acid or a mixture of p-toluic acid with monomethyl terephthalate by the liquid phase oxidation of a methyl-substituted aromatic compound selected from toluene, p-xylene or a mixture of p-xylene with methyl p-toluate with molecular oxygen or a molecular oxygen containing gas in the presence of a heavy metal catalyst whereby condensation of the waste gas from said oxidation reaction results in an organic phase and an aqueous phase containing organic compounds and having a high chemical oxygen demand, a process for treating said organic compounds-containing aqueous phase of high chemical oxygen demand after being separated from said organic phase to lower the chemical oxygen demand of said aqueous phase which comprises distilling the organic compounds-containing aqueous phase at a pH not lower than 9, and recovering distilled water of lower chemical oxygen demand.

3,989,601

PURIFICATION OF 1,1,1-TRICHLOROETHANE BY EXTRACTIVE DISTILLATION

Theodore S. Boozalis; John B. Ivy, and Gordon G. Willis, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sept. 8, 1975, Ser. No. 611,390

Int. Cl.[2] B01D *3/40*

U.S. Cl. 203—61 6 Claims

1. In a method of purifying 1,1,1-trichloroethane from mixtures thereof with higher boiling chlorohydrocarbons by extractive distillation with an auxiliary solvent the improvement of employing as the auxiliary solvent an organic compound selected from the group consisting of saturated and unsaturated tertiary alcohols, organic monocarboxylic acids and organic monocarboxylic acid anhydrides.

3,989,602

METHOD OF MAKING REINFORCED COMPOSITE STRUCTURES

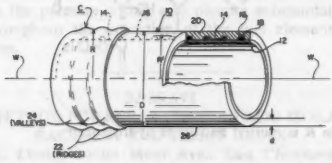
Lee C. McCandless, Silver Spring, Md., and Glenn E. Weber, Vienna, Va., assignors to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 19, 1974, Ser. No. 462,424

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl. C23b *7/02, 5/46*

U.S. Cl. 204—9 6 Claims



1. The process of making a composite structure on a mandrel having a smooth outer surface, said structure including multiple layers of reinforcing filaments spaced at different levels and embedded in a metallic matrix material, including the steps of:

a. winding a filament having at least one flat side as viewed in cross-section onto said smooth outer surface with the flat side thereagainst and precision spacing successive convolutions;

b. depositing metallic matrix material by electroforming onto the convolutions of the filament and onto said outer surface exposed therebetween, and continuing such electroforming until the matrix material between the convolutions builds up above the level of the wound filament;

c. machining the structure by removing matrix material until a new smooth outer surface is exposed above the level of the filament; and

d. repeating said steps to produce another layer.

3,989,603

METHOD OF MANUFACTURING WATCH DIALS AND WATCH DIALS PRODUCED BY THIS METHOD

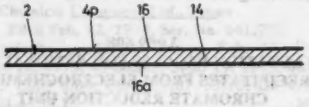
Denis Montavon, Haut-du-Village 13, 2905 Courtedoux, Switzerland

Filed Nov. 25, 1974, Ser. No. 527,160

Claims priority, application Switzerland, Nov. 29, 1973, 16779/73

Int. Cl.² B44C 1/04; B23P 13/00; G04B 19/06

U.S. Cl. 204—18 R 9 Claims



1. A method of manufacturing a watch dial with symbols in relief, comprising the following steps:

taking a plate made of an aluminum-base material capable of undergoing anodizing, intended to form a dial and not yet provided with reliefs,

applying to said plate a basic surface treatment of anodizing which converts said material at the surface of said plate into an oxidized layer having an incrusted nature and tenacity, and which gives said surface a predetermined aspect,

subsequently causing said plate to undergo an embossing operation for forming relief elements corresponding to the desired symbols, said embossing causing said aluminum-base material to appear bare, free of oxidizing, on all visible side surfaces of said relief embossed elements, and said incrusted nature and tenacity of said oxidized layer caused by said anodizing ensuring a clear and crackless demarcation between said bare side surfaces and the remaining anodized surface of said plate at the foot of said side surfaces,

removing said oxidized layer applied by said basic surface treatment of anodizing from the upper surface of said relief elements,

applying to said bared upper and side surfaces of said elements in relief a second surface treatment of anodizing, imparting a particular aspect different from the one given by said basic surface treatment of anodizing,

said second surface treatment of anodizing, carried out without efffect on the parts of surfaces not laid bare, affecting said bared upper and side surfaces of said elements in relief and conferring upon them, by causing said particular aspect to appear likewise on both said upper and said side surfaces of said relief elements, an appearance of real appliques, of a character provided by said second surface treatment of anodizing, standing out from a background having said predetermined aspect given by said first basic surface treatment of anodizing.

3,989,604

METHOD OF PRODUCING METAL STRIP HAVING A GALVANIZED COATING ON ONE SIDE

Lowell W. Austin, Weirton, W. Va., assignor to National Steel Corporation, Pittsburgh, Pa.

Filed Oct. 15, 1975, Ser. No. 622,482

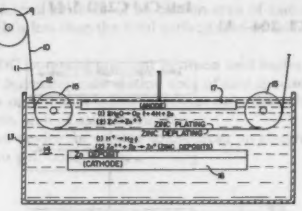
Int. Cl.² C25D 3/22, 7/06, 5/02

U.S. Cl. 204—28 21 Claims

1. A method for treating zinc-coated metal strip material comprising:

a. immersing the strip in an electrolyte solution,

b. passing the strip through the electrolyte solution and between anode means and cathode means, and



c. electrolytically removing a zinc coating from the side of the strip facing the cathode means while simultaneously depositing a substantially equivalent amount of zinc on the opposite side of the strip.

3,989,605

METHOD FOR CONTINUOUS ELECTROLYTIC COLORING OF ALUMINUM ARTICLES

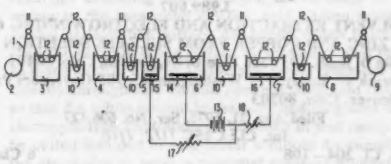
Kiyomi Yanagida; Tadashi Hirokane; Tadashi Tsukiyasu, and Tomoari Sato, all of Nagoya, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 450,259, March 11, 1974. This application Aug. 26, 1975, Ser. No. 607,961

Claims priority, application Japan, Mar. 9, 1973, 48-28143

Int. Cl.² C25D 7/06, 11/22

U.S. Cl. 204—28 7 Claims

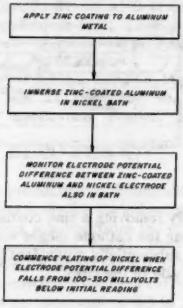


1. A method for continuously electrolytic coloring of an aluminum strip or wire which comprises continuously supplying an aluminum strip or wire into an anodic oxidation bath comprising an aqueous solution containing 10 to 55% by weight of sulfuric acid, said oxidation bath containing a cathode, and then into an electrolytic coloring bath comprising an aqueous solution containing at least one member selected from the group consisting of a nickel salt, a cobalt salt, a copper salt, a tin salt, a ferrous salt and selenious acid, said coloring bath containing an anode, said anode and cathode coupled to an electric circuit including a power source, anodizing said aluminum strip or wire in said anodic oxidation bath by the application of an electrolysis current to said cathode from said power source to form an anodic coating thicker than 2 microns while supplying said aluminum strip or wire into said anodic oxidation bath; and electrolyzing said anodic coating on said aluminum strip or wire while supplying said aluminum strip or wire into said electrolytic coloring bath by the application of current to said anode from said power source to form a colored anodic coating on said aluminum strip or wire wherein said aluminum strip or wire acts as an anode in said anodic oxidation bath and as a cathode in said electrolytic coloring bath without directly connecting said aluminum strip or wire to said power source.

3,989,606
METAL PLATING ON ALUMINUM

William P. Kampert, Lower Burrell, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Sept. 26, 1975, Ser. No. 617,184
Int. Cl.² C25D 5/44
U.S. Cl. 204—33 8 Claims

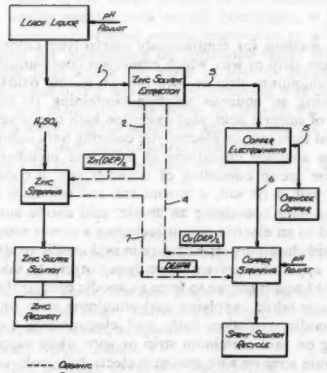

APPLY ZINC COATING TO ALUMINUM METAL
IMMERSE ZINC-COATED ALUMINUM IN NICKEL BATH
MONITOR ELECTRODE POTENTIAL DIFFERENCE BETWEEN ZINC-COATED ALUMINUM AND NICKEL ELECTRODE ALSO IN BATH
COMMENCE PLATING OF NICKEL WHEN ELECTRODE POTENTIAL DIFFERENCE FALLS FROM 100-350 MILLIVOLTS BELOW INITIAL READING

5. In an improved process for electroplating aluminum wherein a zinc coating is applied and removed prior to the electroplating step, the improvement which comprises immersing the zinc-coated aluminum in a bath containing nickel ions but no halogen ions in ionic communication with a nickel electrode to dissolve the zinc until the electrode potential difference between the nickel electrode and the zinc-coated aluminum falls to 100–450 millivolts below the initial electrode potential difference and instantly thereafter commencing said electroplating step.

3,989,607
SOLVENT EXTRACTION AND ELECTROWINNING OF ZINC AND COPPER FROM SULFATE SOLUTION

Philip D. Bush, 1937 Mt. Zion Drive, Golden, Colo. 80401, and Derek W. Bailey, 777 Washington St., 905 Governors Park, Denver, Colo. 80203

Filed Aug. 21, 1975, Ser. No. 606,427
Int. Cl.² C25C 1/12, 1/16
U.S. Cl. 204—108 6 Claims



1. A process for the continuous separation of zinc and copper values from an aqueous solution containing zinc and copper sulfates having a pH of between about 0.5 and 6 comprising:

a. contacting said aqueous solution with an organic extractant comprising copper di(2-ethylhexyl) phosphate to form an organic phase containing zinc di-(2-ethylhexyl) phosphate and an aqueous copper sulfate solution;

b. separating said organic phase from said copper sulfate solution;

c. stripping said organic phase with sulfuric acid to form a zinc sulfate solution and di-(2-ethylhexyl) phosphoric acid;

d. subjecting a portion of said copper sulfate solution to electrowinning to separate copper metal therefrom;

e. contacting a portion of said copper sulfate solution with said di-(2-ethylhexyl) phosphoric acid to form copper di-(2-ethylhexyl) phosphate; and

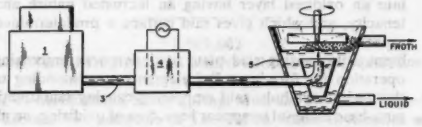
f. returning said copper di-(2-ethylhexyl) phosphate for use in step (a).

4. The process of claim 1 which further comprises the step of electrowinning zinc metal from said zinc sulfate solution.

3,989,608
FLOTATION PROCESS FOR REMOVAL OF PRECIPITATES FROM ELECTROCHEMICAL CHROMATE REDUCTION UNIT

James R. DeMonbrun, Knoxville; Charles R. Schmitt, and Everett H. Williams, both of Oak Ridge, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Dec. 30, 1975, Ser. No. 645,167
Int. Cl.² C25B 1/02, 1/04
U.S. Cl. 204—149 8 Claims



1. An improved process for the electrochemical removal of a metal-ion contaminant from the aqueous blowdown from a cooling tower comprising:

a. introducing said blowdown to an electrolytic cell including an anode having a surface of a material selected from the group consisting of iron, iron alloys, and insoluble compounds of iron and including a cathode;

b. passing through said blowdown in said cell an electric current established between said anode and cathode to form a suspension of a mixed precipitate of iron hydroxide and a hydroxide of said contaminant while evolving gaseous hydrogen at said cathode;

c. establishing above said blowdown in said cell a partial pressure of hydrogen so evolved exceeding atmospheric pressure, thus entraining most of the evolved hydrogen as bubbles in said blowdown in said cell;

d. introducing the resulting hydrogen-rich blowdown containing said suspension into a vented chamber, whereby the hydrogen so entrained combines with particles of said precipitate to form a precipitate-containing froth; and

e. separating said froth from said blowdown.

3,989,609
RADIATION CURABLE RESISTANT COATINGS AND THEIR PREPARATION

Karl Brack, Upton, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.

Filed Sept. 24, 1973, Ser. No. 400,364
Int. Cl.² C08F 8/00; C08G 18/06; C08L 75/06, 75/08
U.S. Cl. 204—159.15 10 Claims

1. A film-forming, spreadable, polymerizable composition suitable for forming thin layers of flexible, abrasion and solvent resistant inks and coatings on a solid surface by rapid

radiation curing in about one second or less, said composition comprising a liquid prepolymer which is the stepwise reaction product of (a) substantially three mols of a polyisocyanate with (b) substantially one mol of a polyether triol and (c) an unsaturated alcohol selected from allyl alcohol, 5-norbornene-2-methanol and hydroxy lower esters of acrylic or methacrylic acid; and sufficient acrylate ester monomer copolymerizable by radiation with said prepolymer to provide coating viscosity, said monomer including at least one monomer having three or more unsaturated acrylate or methacrylate groups to promote cross-linking of said layer.

3,989,610

PHOTOSENSITIVE EPOXY-ACRYLATE RESIN COMPOSITIONS

Katsushige Tsukada; Asao Isobe; Nobuyuki Hayashi; Masahiro Abo, and Ken Ogawa, all of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd., Japan

Filed Feb. 12, 1974, Ser. No. 441,795

Claims priority, application Japan, Feb. 14, 1973, 48-17914; July 18, 1973, 48-80345; Sept. 19, 1973, 48-105064

Int. Cl.² C08F *8/00;* **C08L** *63/02, 63/10;* **G03C** *1/70*

U.S. Cl. 204—159.15 **26 Claims**

1. A photosensitive resin composition which consists essentially of (A) 10 to 90% by weight of a photo-polymerizable unsaturated compound containing at least two terminal ethylene groups, (B) 0.1 to 15% by weight of a sensitizer capable of initiating polymerization of the above unsaturated compound upon irradiation with active rays, (C) 5 to 80% by weight of a compound having at least two epoxy groups and (D) a compound selected from the group consisting of 0.1 to 20% by weight dicyandiamide, 1 to 30% by weight p,p'-diaminodiphenyl compounds, and 0.3 to 1.5 moles per mole of epoxy group of a polycarboxylic acid having at least two carboxyl groups, a polycarboxylic anhydride or mixtures thereof.

3,989,611

RADIATION TREATMENT OF POLYMERS CONTAINING ISOBUTYLENE

Anton Shurpik, Hauppauge, N.Y., assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 321,814, Jan. 8, 1973. This application Aug. 16, 1974, Ser. No. 498,205

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² C08F *2/46;* **C08K** *5/02*

U.S. Cl. 204—159.18 **5 Claims**

1. A process which comprises subjecting compositions containing polymers of isobutylene and copolymers thereof with isoprene, the isoprene content of the copolymers being from 0.6 to 3 mole percent, the average molecular weight of the polymers and copolymers being from 225,000 to 6,000,000 together with from about 1 to 10 percent by weight based on the total weight of polymer or copolymer of a halogenated hydrocarbon radiation catalyst to high energy ionizing radiation at a total dose of from 0.5 to 15 megarads.

3,989,612

ELUTION DEVICE FOR GEL ELECTROPHORESIS

Clifford L. Kragt, and Harold E. Ballen, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Dec. 26, 1974, Ser. No. 536,575

Int. Cl.² G01N *27/26, 27/28*

U.S. Cl. 204—180 G **14 Claims**

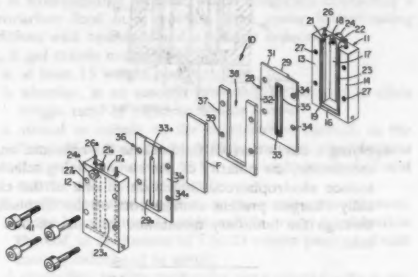
1. A method for eluting solutes from electrophoresis separation gels, which comprises:

placing a preformed, elongated, thin, electrophoresis separation gel specimen containing at least one band of solute therein into a gel specimen holder, said specimen comprising a portion of an electrophoresis separation gel prepared by subjecting a starting mixture of solutes to gel electrophoresis to separate the components of the starting mixture whereby they are present as discrete bands in the gel;

placing buffer solutions in direct surface contact with the opposite lateral surfaces of an elution area of said specimen which is less than the total surface area of said specimen; and

applying a DC potential gradient between said buffer solutions and traversing said elution area of said specimen to elute into one of said buffer solutions only the solute in said elution area of said specimen.

4. An elution device for eluting solute from an electrophoresis separation gel, comprising:



first and second containers each having a cavity therein for receiving a buffer solution and an electrode disposed in each cavity, means defining a recess for holding an elongated, thin electrophoresis separation gel between said containers and in sealed relationship therewith, and means defining a pair of laterally aligned, through, elution openings extending from opposite lateral sides of said recess to the respective cavities, said elution openings having at least one surface dimension which is shorter than the corresponding surface dimension of said recess so that a zone of limited area of said recess communicates directly through said elution openings with said cavities so that the solute present in the corresponding zone of an electrophoresis separation gel disposed in said cavity can be eluted into one of said buffer solutions by energizing the electrodes to apply a potential gradient transversely across the gel.

3,989,613

CONTINUOUS BALANCED FLOW FIXED BOUNDARY ELECTROPHORESIS

Gerhard Gritzner, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 16, 1973, Ser. No. 360,990

Int. Cl.² G01N *27/40;* **B01D** *13/02*

U.S. Cl. 204—180 R **5 Claims**

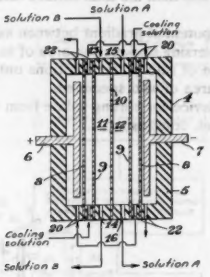
1. A method useful for electrophoretic separation of aqueous solutions containing a mixture of electrically charged protein components, comprising:

continuously passing a first solution containing protein components to be separated and having a pH between the isoelectric points of the proteins to be separated along one surface of a permeable, non-conducting boundary membrane in an electrophoresis cell;

simultaneously passing a second solution along the opposite surface of said membrane;

introducing the first and second solutions into the electrophoresis cell on opposite sides of the boundary membrane and continuously withdrawing each solution from the cell after passage along its corresponding surface of the boundary membrane, the withdrawal of each solution being at a volumetric flow rate approximately equal to its

volumetric rate of introduction, and maintaining the hydrostatic pressure of the first solution on one side of the boundary membrane equal to the pressure of the second solution on the opposite side thereof, whereby net liquid transport across said membrane is minimized; and



applying a direct current field across the solutions and the membrane, the polarity of the current being selected to induce electrophoretic migration of one of the electrically charged protein components of the first solution through the boundary membrane into the second solution.

3,989,614

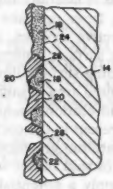
GAS SENSOR

Tseng Ying Tien, 660 Archwood, Ann Arbor, Mich. 48103

Filed Jan. 8, 1975, Ser. No. 539,270

Int. Cl.² G01N 27/46

U.S. Cl. 204—195 S **4 Claims**



1. An oxygen sensor including a wall of solid oxygen-ion conductive electrolyte having at least a portion of a first of its surfaces coated first with a porous layer of an electron conductive, oxygen-ion and hydrogen molecule impervious material and then with a porous coating of a platinum family catalyst, arranged so that said catalyst is in sufficient proximity to the electrolyte at at least certain points associated with the pores of the impervious material to catalyze a reaction between gases passing over the first surface and oxygen-ions diffusing through the electrolyte, and separate electrodes electrically connected to said platinum family catalyst and the opposed wall surface.

3,989,615

DIAPHRAGM PROCESS ELECTROLYTIC CELL

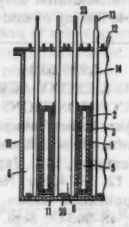
Shotaro Kiga; Shozo Chiba; Kenichi Edahiro; Naoshi Yoshida, all of Nakago, and Masuo Nagasawa, Myokokogen, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 159,821, July 6, 1971, abandoned. This application Aug. 20, 1973, Ser. No. 390,098

Int. Cl.² C25B 1/20, 1/26, 13/04, 11/03

U.S. Cl. 204—252 **3 Claims**

1. A chloro-alkali electrolytic cell which operates at a current density of 40 to 60 amperes per square decimeter, comprising anode and cathode compartments with a metal anode and a metal cathode opposing each other and a diaphragm therebetween, the distance between said anode and said cathode being at most 12 mm, said anode being a metal plate having holes or slots, said cathode being a rough metal wire net or plate having holes or slots, said diaphragm having a thickness of 1 mm to 10 mm, being permeable to brine and being made of a non-conductive adsorbing layer, said adsorbing layer being made of a mixture of asbestos fibers and from 1 to 30 percent by weight of carbon fibers, said carbon fibers having a diameter of approximately 7 to 10μ, and a net having a mesh size of 10 to 32 Tyler, said adsorbing layer being formed by adhering said mixture on said net by suction, said diaphragm being disposed between said cathode and said anode so that said net contacts the active face of said cathode at discrete points and said adsorbing layer faces or contacts the active face of said anode.



3,989,616

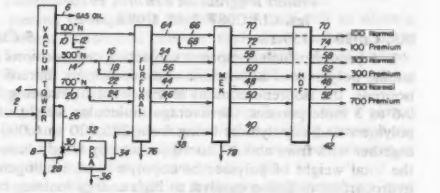
PRODUCTION OF LUBRICATING OILS BLENDING STOCKS AND SELECTED COMPONENTS FOR ASPHALT PRODUCTION

Charles A. Pagen, Woodbury, and Richard J. Petrucco, Laurel Springs, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Aug. 30, 1974, Ser. No. 501,954

Int. Cl.² C10C 3/04, 3/06

U.S. Cl. 208—6 **14 Claims**



1. A method for producing asphalts of specification grade defined in tables 3, 4, and 5 of the specification which comprises,

preparing residual hydrocarbon components of a crude oil by vacuum distillation and solvent extraction to produce fractions selected from the group consisting of (a) a vacuum tower bottoms fraction, (b) an overflash fraction lower boiling than said vacuum tower bottoms recovered from said vacuum tower, (c) a tar product fraction obtained by solvent deasphalting a mixture of said vacuum tower bottoms and said overflash fraction, (d) a polycyclic rich furfural extract fraction obtained from a heavy oil product of propane deasphalting a mixture of said vacuum tower bottoms and said overflash fraction;

blending two or more of said components to form an asphalt satisfying the requirements of tables 3, 4, and 5.

3,989,617

CATALYTIC TREATMENT OF LUBRICATION OIL BASE STOCK FOR IMPROVEMENT OF OXIDATIVE STABILITY

Tsoung-Yuan Yan, Trenton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 390,285, Aug. 21, 1973, abandoned. This application Nov. 22, 1974, Ser. No. 526,433

Int. Cl.² C10G *37/04*

U.S. Cl. 208—87 **7 Claims**

1. In the process of producing a lubricant base stock, said process consisting essentially of vacuum fractionating a crude oil residuum to produce a lubricant raw material and solvent refining said raw material to produce a refined oil having a viscosity at 100° F of from about 50 S.U.S. to about 1000 S.U.S. and a pour point less than about 30° F, the improvement whereby is produced an upgraded lubricant base stock of enhanced oxidation stability which comprises: contacting said refined oil with a crystalline aluminosilicate zeolite, said zeolite being in the hydrogen form, at a temperature of from about 325° F to about 700° F and a space velocity of from about 0.1 to about 10 LHSV, said zeolite having a constraint index of about 1 to 12 and a silica to alumina ratio of at least 12; and recovering at least 90 percent by weight of an upgraded lubricant base stock.

3,989,618

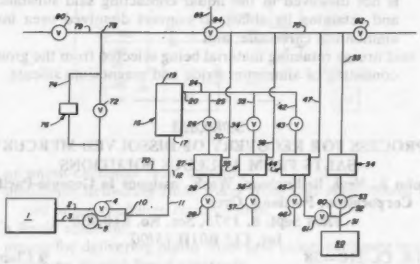
PROCESS FOR UPGRADING A HYDROCARBON FRACTION

John D. McCollum, Munster, Ind., and Leonard M. Quick, Park Forest South, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed May 31, 1974, Ser. No. 474,928

Int. Cl.² C10G *9/34, 31/08*

U.S. Cl. 208—106 **11 Claims**



1. A process for upgrading a hydrocarbon fraction containing paraffins, olefins, olefin-equivalents, or acetylenes, as such or as substituents on ring compounds, and sulfurous and metallic contaminants comprising cracking, desulfurizing, and demetalating the hydrocarbon fraction by contacting said hydrocarbon fraction with a water-containing fluid under super-atmospheric pressure and at a temperature in the range of from about 705° to about 900° F., in the absence of an externally supplied catalyst for cracking, desulfurization, or demetalation, and of externally supplied hydrogen, wherein sufficient water is present in the water-containing fluid and said pressure is sufficiently high so that the water in the water-containing fluid has a density of at least 0.10 gram per milliliter and serves as an effective solvent for the hydrocarbon fraction; and lowering said temperature or pressure or both, to thereby make the water in the water-containing fluid a less effective solvent for the hydrocarbon fraction and to thereby form separate phases and solid elemental sulfur wherein essentially all the sulfur removed from the hydrocarbon fraction is in the form of solid elemental sulfur.

3,989,619

HYDROTREATING PROCESS EMPLOYING THERMACTIVATED CATALYSTS COMPRISING CATALYTIC METALS-FREE CRYSTALLINE ZEOLITIC MOLECULAR SIEVE PARTICLES DISPERSED IN A GEL MATRIX

Joseph Jaffe, Berkeley, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 64,099, July 29, 1970, Pat. No. 3,953,364, which is a continuation of Ser. No. 757,503, Sept. 4, 1968, abandoned, which is a continuation-in-part of Ser. No. 749,836, Aug. 2, 1968, abandoned. This application Nov. 17, 1975, Ser. No. 632,554

Int. Cl.² C10G *13/06;* **B01J** *27/04, 29/12*

U.S. Cl. 208—111 **4 Claims**

1. A hydrotreating process, which comprises contacting a hydrocarbon feed in a reaction zone under hydrotreating conditions with hydrogen and a catalyst comprising:

A. A gel matrix comprising:

a. at least 15 weight percent silica,

b. alumina, in an amount providing an alumina-to-silica weight ratio of 15/85 to 80/20,

c. nickel or cobalt, or the combination thereof, in the form of metal, oxide, sulfide, or any combination thereof, in an amount of 1 to 10 weight percent of said matrix, calculated as metal,

d. molybdenum or tungsten, or the combination thereof, in the form of metal, oxide, sulfide or any combination thereof, in an amount of 5 to 25 weight percent of said matrix, calculated as metal;

B. A crystalline zeolitic molecular sieve substantially in the ammonia or hydrogen form, substantially free of any catalytic loading metal or metals, said sieve further being in particulate form and being dispersed through said matrix;

said catalyst composite being further characterized by an average pore diameter below 100 Angstroms and a surface area above 200 square meters per gram;

said catalyst composite being further characterized by hydrocracking activities and stabilities developed therein by heating said catalyst composite in an oxygen-containing gas stream at temperatures in the range 1200° F. to 1600° F. for 0.25 to 48 hours;

and recovering hydrotreated products from said reaction zone.

3,989,620

ROTARY DISTRIBUTOR PLATE FOR A CENTRIFUGAL AIR CLASSIFIER

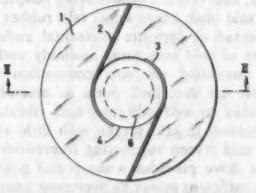
Julius Heinrich Johannes Stern, deceased, late of Dortmund-Hochsten, Germany, by Erika Stern, heir; Werner Strauss, Bochum-Dahlhausen, and Albert Kohlmann, Bochum, both of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Mar. 3, 1975, Ser. No. 554,774

Claims priority, application Germany, Feb. 2, 1974, 2405122

Int. Cl.² B07B *7/083*

U.S. Cl. 209—148 **6 Claims**



1. Rotary distributor plate for distributing particles of solid or liquid material in a centrifugal-type classifier comprising a

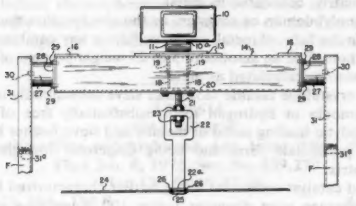
plate-like member having an upper surface, an outer edge, and an inner ring-shaped feed zone onto which partiles of material are fed; and means projecting from said surface for outwardly guiding and throwing off from said plate-like member particles of material fed to said inner-ring shaped zone, said throwing-off means having an inner portion tangentially engaging and contiguous with said ring-shaped feed zone and an outer portion extending therefrom to said outer edge of said plate-like member.

3,989,621

VIBRATORY SCREENER

Richard L. Breudigam, Fairview Park, Ohio, assignor to The Cleveland Vibrator Company, Cleveland, Ohio

Filed June 14, 1974, Ser. No. 479,373
Int. Cl.² B07B *1/34, 1/42*
U.S. Cl. 209—326 1 Claim



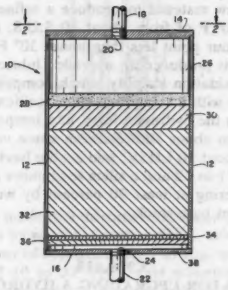
1. A mechanical vibratory screen drive for attachment to a screen mounted in a stationary main framework comprising a unitary motor driven mechanical vibrator; means for producing power to said vibrator; a vibrator mounting rigidly connected with said vibrator; a rigid cross beam structural assembly rigidly connected therewith and extending laterally substantially equally in opposite horizontal directions therefrom; a vibrator driving stud rigidly connected with said structural assembly directly beneath said vibrator; an attachment bracket rigidly connected with said driving stud and extending vertically downward therefrom; there being means at the lower end of said bracket adapted for rigid attachment to said screen only and at one location immediately below said bracket; vibration isolating means adapted to isolate the vibrator from the main screen support framework consisting of a plurality of rubber mounts; bracket means at opposite ends of said structural assembly; said structural assembly including a vertical plate, said bracket means being adapted to be rigidly attached to said main framework; said rubber mounts being firmly connected at opposite horizontal ends between the vertical plate of said structural assembly and said bracket means and providing the sole connection therebetween; whereby with the described parts so assembled and with power provided to said vibrator, said vibrator will supply effective vibration to said screen with little vibrator energy supplied to said screen supporting framework, the force of said vibrator drive provides a sharp and positive screening motion with sufficient power to overcome heavy screen loads on fine mesh screens, and widely varying loads on said screen will have little effect on the amplitude of screen vibration since it is not a tuned vibration system.

3,989,622

UREASE IN INSOLUBLE FORM FOR CONVERTING UREA PRESENT IN A LIQUID

Laurence B. Marantz, Sherman Oaks, and Mario G. Giorgianni, Santa Ana, both of Calif., assignors to CCI Life Systems, Inc., Van Nuys, Calif.

Continuation-in-part of Ser. No. 102,715, Dec. 30, 1970, abandoned. This application May 21, 1973, Ser. No. 362,120
Int. Cl.² B01D *13/00*
U.S. Cl. 210—22 R 43 Claims



1. A substance for converting dissolved urea present in a liquid;

means for locating said substance in said liquid;

said substance comprising a urease retaining material having urease adsorbed thereon for converting urea in said liquid into ammonium carbonate;

said adsorbed urease being insoluble in said liquid so that it is not dissolved in the liquid contacting said substance and retaining its ability to convert dissolved urea into ammonium carbonate; and

said urease retaining material being selected from the group consisting of aluminum oxide and magnesium silicate.

3,989,623

PROCESS FOR RECOVERY OF DISSOLVED MERCURY SALTS FROM AQUEOUS SOLUTIONS

John A. Neal, Bellingham, Wash., assignor to Georgia-Pacific Corporation, Portland, Oreg.

Filed Sept. 8, 1975, Ser. No. 610,938
Int. Cl.² B01D *15/00*
U.S. Cl. 210—28 9 Claims

1. A process for removing mercury from an aqueous solution containing dissolved mercury salts which comprises, treating the solution with a water-soluble sulfide compound to react mercury with the sulfide ion to form a mercury sulfide precipitate, contacting the solution containing the mercury sulfide precipitate with zinc sulfide particles at a pH in the range of 3 to 8.5 to remove the mercury sulfide from the solution.

3,989,624

METHOD AND APPARATUS

William A. Wachsmuth, Mississauga, Canada, assignor to Ecodyne Limited, Oakville, Canada

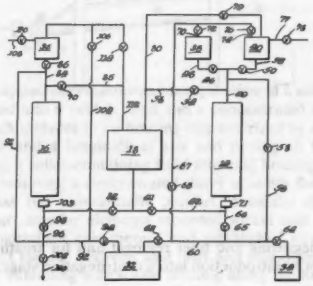
Filed Dec. 20, 1972, Ser. No. 316,722
Int. Cl.² C02B *1/42, 1/56*
U.S. Cl. 210—34 11 Claims

1. A method for rinsing an object having a source of chromium-containing anions thereon while preventing the delivery of chromium-containing anions to the environment comprising:

passing rinse water over said object, whereby to form a solution of chromium-containing anions;

delivery said solution of chromium-containing anions to an anion-exchange resin, whereby to remove said chromium-containing anions and to form purified water;
delivering said purified water to a reservoir;
passing water from said reservoir over said object;
periodically regenerating said anion-exchange resin by sequentially backwashing said resin with water from said reservoir; delivering a dilute solution of alkali metal hydroxide from a dilute anion regenerant tank to said resin; delivering a more concentrated solution of alkali metal hydroxide from a concentrated anion regenerant tank to said resin; and rinsing said resin with water from said reservoir;
delivering the effluent from said regenerating of said anion-exchange resin sequentially to a dilute chromate solution storage tank, to a concentrated chromate solution tank, to said dilute anion regenerant tank, to said concentrated anion regenerant tank, and to said dilute chromate solution tank; and
delivering said effluent from said dilute chromate solution tank to said resin.

6. Improved apparatus for rinsing an object having chromium-containing ion thereon comprising:
rinse means for risning objects having a source of chromium-containing anions thereon;
rinse water delivery means communicating with said rinse means;



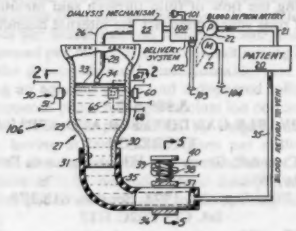
an anion-exchange resin column;
means for delivering rinse water from said rinse means to said anion-exchange resin column;
a liquid reservoir;
means for delivering liquid from said anion-exchange resin column to said liquid reservoir;
means for delivering liquid from said reservoir to said rinse water delivery means;
means for delivering liquid from said reservoir to said anion-exchange resin column;
a dilute anion regenerant tank;
means for delivering regenerant from said dilute anion regenerant tank to said anion exchange resin column;
a concentrated anion regenerant tank;
means for delivering regenerant from said concentrated anion regenerant tank to said anion-exchange resin column;
a dilute chromate solution tank;
means for delivering liquid from said anion-exchange resin column to said dilute chromate solution tank;
means for delivering liquid from said dilute chromate solution tank to said anion-exchange resin column;
a concentrated chromate solution storage tank;
means for delivering liquid from said anion exchange resin column to said concentrated chromate storage tank; and
means for delivering liquid from said anion exchange resin column to said concentrated and dilute anion regenerant tanks.

3,989,625

DETECTOR FOR AIR IN BLOOD DIALYSIS SYSTEMS

Barry D. Mason, Burbank, Calif., assignor to Ma-De Inc., Burbank, Calif.

Filed Feb. 25, 1975, Ser. No. 552,984
Int. Cl.² B01D *31/00*
U.S. Cl. 210—94 **20 Claims**



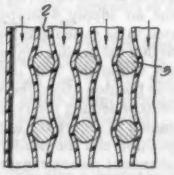
1. A sensor system for detecting the absence of substantially air-free blood from a blood chamber, said blood chamber including a wall with a transparent portion, said sensor system comprising: a first radiation source, a second radiation source, each having a respective axis; and sensor means responsive to said radiation, said sensor means being aligned with and intersecting the axis of the first source, and on the other side of the blood chamber therefrom, and being out of alignment with, and not intersecting, the axis of the second source, the radiation from the first source being substantially focused on the sensor means, and the radiation from the second source illuminating a substantial area of said transparent portion lying transverse to its own axis, the sources and sensor means all lying outside of and being directed toward said transparent portion, whereby radiation from the first source is directly perceived by the sensor means when only air lies within the blood chamber between the first source and the sensor means, and not perceived by it when there is blood between the first source and the sensor means, and whereby radiation from the second source is perceived by the sensor means when there is reflection from blood foam in the blood chamber in the path of reflection between the parts of the transparent portion visible to the second source and to the sensor means, and perceived less when there is either foam-free blood, or no blood in the said path of reflection.

3,989,626

MEMBRANE TRANSFER PROCESS AND APPARATUS

Donald J. Bentley, Newport Beach, and Donald A. Raible, Orange, both of Calif., assignors to Bentley Laboratories, Inc., Irvine, Calif.

Continuation of Ser. No. 364,947, May 29, 1973, abandoned. This application Dec. 30, 1974, Ser. No. 537,577
Int. Cl.² B01D *31/00*
U.S. Cl. 210—177 **7 Claims**



1. In an apparatus for modifying the properties of a fluid by adding or removing a substance in which said fluid flows through a tubular membrane capable of permitting a substance to pass therethrough, the improvement comprising the

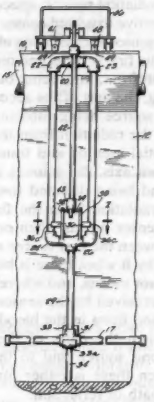
provision of an irregular configuration on the inner surface of the tubular membrane in a manner effective to create secondary flow in the fluid flowing through said tubular membrane such that the resistance to flow through said membrane is substantially reduced, said irregular configuration comprising spaced constrictions in the diameter of said tubular membrane and said tubular membranes having an unconstricted diameter of approximately ⅛ inch to ⅜ inch said constrictions maintained during the flow of fluid through said membrane by a plurality of rods which constrict the internal diameter of said membrane.

3,989,627

REMOVABLE GAS DIFFUSER AND APPARATUS THEREFOR

Robert E. Crandall, Greendale, Wis., assignor to Envirex Inc., Waukesha, Wis.

Filed Sept. 30, 1975, Ser. No. 618,172
Int. Cl.² C02C 1/12
U.S. Cl. 210—220 **10 Claims**



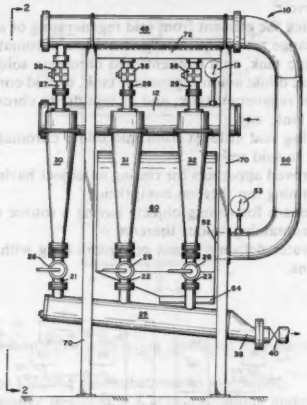
1. In an air diffusion system for an aeration tank having an air supply and a walkway alongside the tank, said system including upper and lower air supply pipes, a horizontal header fixed and connected to the lower end of the lower pipe, said upper and lower pipes having an interconnecting rotary joint and the upper of said pipes having a fixed rotary joint for connection to the air supply whereby the lower pipe and header are adapted to be raised and lowered in an arc about said fixed joint so that the header can be disposed either in its operating position within the tank directly below the fixed joint or in a similar position above the walkway for servicing, said pipes and interconnecting rotary joint including resilient detent means adapted to secure the upper and lower pipes in their extended position and the header in its operating position, and fixed abutment means engageable by the header in approaching and leaving its operating position and disposed to secure the header laterally in its operating position, the resilient detent means being releasable upon raising of the lower pipe and header and reengageable and operable to guide the header into position between said abutments upon relowering of the lower pipe and header.

3,989,628

DEGRITTING AND FIBER REMOVAL SYSTEM

Thomas H. Bier, Stamford, Conn., assignor to Dorr-Oliver Incorporated, Stamford, Conn.

Filed Jan. 3, 1975, Ser. No. 538,443
Int. Cl.² C02C 1/24
U.S. Cl. 210—255 **3 Claims**



1. A degritting and fiber removal unit for treating sewage feed prior to introduction into a centrifugation stage, comprising

a plurality of hydrocyclones arranged in a parallel flow pattern for degritting said feed,

an inlet manifold connected to the hydrocyclone inlets for introducing grit and fiber-containing feed into said hydrocyclones,

an underflow manifold chamber connected to each underflow outlet of said hydrocyclones for grit disposal,

said underflow manifold chamber being inclined from the horizontal to provide gravity flow of the grit-containing effluent within said chamber, and having a constricted inlet at the lower end to limit the underflow from said manifold chamber to maintain elevated pressure within the manifold chamber and in said hydrocyclones,

an overflow manifold connected to each overflow outlet of said hydrocyclones,

a screen device comprised of a plurality of spaced, parallel bars having an arcuate extent of 300° for fiber removal having an inlet,

said hydrocyclones being internally sized to utilize no more than about one-half the pressure drop across the unit thereby providing sufficient pressure at the screen inlet to assure a feed velocity of at least 35 ft/sec across the screen surface,

a downcomer connecting said overflow manifold with the inlet of said screen device, and

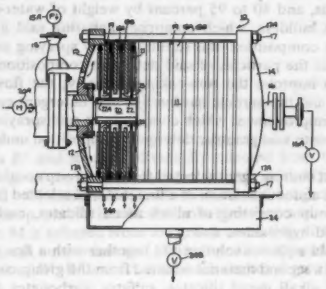
the members comprising said unit, including said hydrocyclones, screen device, manifolds and connecting conduits, being mounted on a single supporting frame for transportation and installation as a unit to maintain the predetermined positions of said members and conduits.

3,989,629

APPARATUS AND SYSTEM FOR STABILIZING THE DISC ELEMENTS OF A ROTARY CONCENTRATOR FOR SOLIDS-CONTAINING FLUIDS

James Donovan, Cambridge, Mass., assignor to Artisan Industries Inc., Waltham, Mass.

Filed July 17, 1975, Ser. No. 596,639
Int. Cl.² B01D 25/38
U.S. Cl. 210—298 15 Claims



1. In an apparatus for continuous separation of a solids-containing fluid into a vehicle fluid and a concentrated slurry of solids which includes (1) a housing characterized by an interior surface and a longitudinal axis and having an inlet for introducing a solids-containing fluid into said housing and an outlet for removing a concentrated slurry of solids therefrom; (2) at least two substantially parallel, coaxially disposed, spaced-apart annular elements mounted within said housing on the longitudinal axis thereof and established stationarily with respect thereto between said inlet and said outlet; (3) a rotor shaft extending within said housing along the longitudinal axis thereof and passing coaxially through said annular elements in spaced diametral relation thereto leaving openings for fluid flow between the outer surface of said shaft and the inner circumferential surfaces of said annular elements, said shaft being rotatable with respect to said housing and said annular elements, and (4) a radially extensive rotor element having one side and another, opposite side and an outside edge mounted to said rotor shaft to turn therewith its outside edge terminating in spaced relation to the interior surface of said housing and positioned between said spaced-apart annular elements to define a flow path for solids-containing fluid from said inlet to said outlet extending across at least one side of one of said spaced-apart annular elements between it and one side of said rotor element, then between the outside edge of said rotor element and the interior surface of said housing and then between the other, opposite side of said rotor element and the other of said annular elements with at least one of those elements being a filter means comprising a filter chamber having at least one filtering surface serving as a boundary of said flow path with the interior of that chamber being in fluid flow communication with the exterior of said housing for the removal of filtrate vehicle fluid from that chamber, the improvement comprising at least one first stabilizing member secured to said rotor element and having a portion extending radially outwardly from said rotor element toward the interior surface of said housing and means on the interior surface of said housing for receiving said portion and for permitting movement of said portion in a circular path when said rotor element to which said stabilizing member is secured is rotated relative to said housing.

3,989,630

LOW SOLIDS SHALE CONTROLLING DRILLING FLUID

Clarence O. Walker, Richmond, Tex., assignor to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 309,327, Nov. 24, 1972, abandoned. This application Dec. 9, 1974, Ser. No. 530,911
Int. Cl.² C09K 7/02, 7/04
U.S. Cl. 252—8.5 A 16 Claims

1. An aqueous, low solids drilling fluid comprising:
   a. an aqueous fluid comprising from about 1 to about 10 pounds per barrel calcium hydroxide and from about ⅛ to 1 pound per barrel of a calcium salt having a solubility in water greater than calcium hydroxide, said fluid comprising an aqueous phase and a dispersed solid phase;
   b. said aqueous phase having a calcium ion concentration of at least 200 parts per million by weight, said aqueous phase having at least 50,000 parts per million sodium chloride dissolved therein and an alkalinity of at least 0.1 milliliters of 0.02 normal sulfuric acid per milliliter of aqueous phase when titrated to the phenolphthalein end point;
   c. said dispersed solid phase comprising a viscosity increasing material selected from the group consisting of attapulgite, asbestos and a mixture thereof, in a predetermined amount sufficient to cause drilling fluid to have a plastic viscosity of from about 5 to about 20 centipoise at a yield point of from about 5 to about 40 and a ratio of plastic viscosity to yield point of from about 0.25 to about 1.0; and
   d. said fluid having a whole drilling fluid alkalinity of from 10 to 30 milliliters of 0.02 N sulfuric acid per milliliter of whole drilling fluid when titrated to the phenolphthalein end point.

3,989,631

FABRIC TREATING COMPOSITIONS COMPRISING CLAY MIXTURES

Mario S. Marsan, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Dec. 17, 1974, Ser. No. 533,742
Int. Cl.² D06M 11/00
U.S. Cl. 252—8.6 10 Claims

1. A clay-based fabric conditioning composition comprising clay mixtures selected from: mixtures of hydrophilic Laponite clay and hydrophobic Laponite clay, at a weight ratio of hydrophilic Laponite to hydrophobic Laponite of from about 20:1 to about 1:20; mixtures of hydrophilic Laponite clay and smectite clay, at a weight ratio of hydrophilic Laponite to smectite of from about 20:1 to about 1:20; and mixtures of hydrophobic Laponite clay and smectite clay, at a weight ratio of hydrophobic Laponite to smectite clay of from about 20:1 to about 1:20, wherein the smectite clay in the admixture with the hydrophilic Laponite clay and hydrophobic Laponite clay has an ion exchange capacity of at least 50 meq/100 g.

3,989,632

METHOD OF CONDUCTING DRILLING OPERATIONS

Paul W. Fischer, Whittier; David S. Pye, Brea, and Julius P. Gallus, Anaheim, all of Calif., assignors to Union Oil Company of California, Brea, Calif.

Continuation-in-part of Ser. Nos. 293,388, Sept. 29, 1972, Pat. No. 3,882,029, and Ser. No. 293,389, Sept. 29, 1972, Pat. No. 3,870,668. This application Jan. 9, 1975, Ser. No. 539,686
The portion of the term of this patent subsequent to May 6, 1975, has been disclaimed.
Int. Cl.² E21B 43/25; C09K 7/02
U.S. Cl. 252—8.5 A 10 Claims

1. In the method of conducting a drilling operation in a well penetrating a permeable subterranean formation which requires the introduction of a fluid into the well and into contact with the formation wall under conditions wherein there is an undesirable loss of said fluid from the well into the surrounding formation, the improvement which comprises introducing

into said well as said fluid an aqueous dispersion of about 4–10 lbs. per barrel of finely divided, oil-soluble, water-insoluble solid particles in an aqueous salt solution containing about 1–5 lbs. per barrel of chrome lignite, about 0.1–2 lbs. per barrel of xanthan gum, about 0.1–1 lb. per barrel of hydroxyethylcellulose, and at least about 1 wt.% of a water-soluble inorganic alkaline metal or ammonium salt; said solid particles comprising a homogeneous solid solution of (1) wax, (2) an oil-soluble surface active glyceryl or sorbitan partial ester of saturated higher fatty acid, and (3) a water-dispersible surface active polyethylene glycol monoester of a saturated higher fatty acid.

3,989,633

WINDSHIELD WASHER FLUIDS CONTAINING FROM 10-1000 PPM OF ACRYLAMIDE POLYMER TO REDUCE WEAR OF WIPER BLADES AND REDUCE WINDAGE LOSSES OF FLUID

Alvin J. Frisque, La Grange, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 527,663, Nov. 27, 1974, abandoned. This application June 11, 1975, Ser. No. 586,004

Int. Cl.² B08B *3/00*; C09K *3/18*

U.S. Cl. 252—11 **1 Claim**

1. A process for cleaning a windshield and for treating rubber windshield wiper blades comprising applying to said windshield a windshield washer fluid containing a major proportion of water, one or more water-soluble alcohols which are predominantly monohydric alcohols capable of depressing the freezing point of water, a surfactant, and from 10–1000 ppm of acrylamide polymer with molecular weight at least 10,000, said acrylamide polymer preventing excessive wear of said rubber windshield wiper blades and reducing windage losses of said windshield wiper fluid.

3,989,634

DETERGENT CONTAINING A TENSIDE WITH ACTIVATING POWER

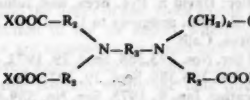
Karel Prochazka, Krivoklat; Jan Novak, Prague; Jaroslav Simunek, Rakovnik; Vlastimil Peterka, Roztoky u Krivoklatu, and Vaclav Krob, Nesuchyne, all of Czechoslovakia, assignors to Tukovy prumysl, oborove reditelstvi, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 301,636, Oct. 27, 1972, abandoned. This application Aug. 12, 1974, Ser. No. 496,548

Int. Cl.² C11D *3/08*, *7/18*, *9/08*

U.S. Cl. 252—89 R **4 Claims**

1. A mixture consisting of from 3–99 per cent, by weight, of a synthetic tenside having the general formula



wherein

R_2 is an alkyl radical having from 1–3 carbon atoms, R_3 is an alkyl radical having from 2–4 carbon atoms, k is an integer from 0–20, d is an integer from 0–1, r is an integer from 6–30, t is an integer from 8–58, Z is selected from the group consisting of H and —NH and X is selected from the group consisting of an alkali metal and hydrogen, the sum of the carbon atoms in k and C_rH_tZ being at least 8, the remainder of said mixture consisting of conventional detergent ingredients.

3,989,635

PROCESS FOR IMPROVING GRANULAR DETERGENTS

Sadao Toyoda; Kuniyoshi Takenouchi, both of Funabashi; Norihiro Ohno, Chofu, and Noboru Hara, Tokyo, all of Japan, assignors to Lion Fat & Oil Co., Ltd., Tokyo, Japan

Filed Sept. 6, 1974, Ser. No. 503,669

Claims priority, application Japan, Sept. 10, 1973, 48-102404

Int. Cl.² C11D *3/08*, *11/00*

U.S. Cl. 252—135 **12 Claims**

1. In a process for improving a granular detergent composition consisting essentially of 5 to 40 percent by weight of water-soluble surfactant selected from anionic and nonionic surfactants, and 40 to 95 percent by weight of water-soluble detergent builders, which comprises agitating said granular detergent composition and simultaneously spraying onto the surfaces of the particles of said detergent composition a substance to improve the non-caking property, the flowability property and the particle hardness of said detergent composition, the improvement which comprises: in said spraying step, spraying onto said granular detergent composition undergoing agitation

a. a first coating agent selected from the group consisting of
   1. an aqueous solution of a first material selected from the group consisting of alkali metal silicates, carbonates and hydroxides, and
   2. said aqueous solution (1) together with a fine powder of a second material selected from the group consisting of alkali metal silicates, sulfates, carbonates and hydroxides,

   wherein the total amount of said first coating agent, calculated as the solids, is from 0.5 to 8 parts by weight, per 100 parts by weight of said detergent composition, and wherein in first coating agent (2) the weight ratio of said aqueous solution, calculated as the solids, to said fine powder is from 1/10 to 10/1, and

b. a second coating agent consisting of an aqueous solution of aluminum sulfate, wherein the amount of said second coating agent, calculated as the solids, is from 1 to 10 parts by weight, per 100 parts by weight of said detergent composition

so that said aluminum sulfate reacts with said first material on the surfaces of the detergent particles to form thereon a coating film of a water-insoluble or poorly water-soluble substance,

the coating of the detergent particles being performed at a temperature of from 10° to 250° C for a time period of from 10 seconds to 10 minutes;

and drying the thus-coated detergent composition.

3,989,636

POLYMERIC COMPOSITION WITH CHELATING PROPERTIES

Elmer Domba, Olympia Fields, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed June 19, 1975, Ser. No. 588,536

Int. Cl.² C02B *1/00*, *1/22*

U.S. Cl. 252—180 **4 Claims**

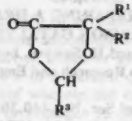
1. A composition useful in preventing and removing hardness in boiler water consisting essentially of a copolymer of an amino acid chosen from the group consisting of glycine and aspartic acid, and an epihalohydrin, said copolymer having a molecular weight in the range of 300 to 700.

3,989,637
CORROSION INHIBITORS AND PROCESSES FOR USING THE SAME

Ronald D. Hogue, Manchester; Thomas M. King, Creve Coeur, and Robert S. Mitchell, Webster Groves, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed June 2, 1975, Ser. No. 583,073
Int. Cl.² C02B *1/00, 3/06*
U.S. Cl. 252—180 **20 Claims**

1. A method of inhibiting the corrosion of metals in contact with an aqueous corrosive medium which comprises maintaining in said medium a carboxylated lactone having the formula



wherein R^1 and R^2 are individually selected from the group consisting of hydrogen, hydroxy, alkyl, hydroxyalkyl, —COOM, —CHOHCOOM, —CH_2COOM and a 1,3-dioxolane, 5-oxo group, and R^3 is selected from hydrogen and —COOM, wherein M is selected from the group consisting of hydrogen, alkali metal, ammonium and alkylammonium, provided that at least one of R^1, R^2 and R^3 contains a carboxyl group.

3,989,638
BLEACHING ARTICLE

William Jack Bradley, and Mario Stephen Marsan, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 27, 1975, Ser. No. 562,528
Int. Cl.² C11D *3/395, 7/54;* **D06L** *3/08, 3/02*
U.S. Cl. 252—186 **15 Claims**

1. A fabric bleaching article comprising an effective amount of a bleaching composition having a viscosity of from about 200 cps to about 100,000 cps, comprising:

a. an effective amount of a solid, substantially water-insoluble peroxygen compound;

b. an effective amount of a starch thickening agent; and

c. a liquid carrier,

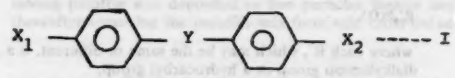
wherein said bleaching composition is in releasable combination with a water-insoluble dispensing means characterized by being in the form of a pouch having perforations of a diameter from about 0.05 to about 3 mm or embossed in such a manner that upon rupture perforations are formed having a diameter of from about 0.05 to about 3 mm.

3,989,639
NEMATIC LIQUID CRYSTAL COMPOSITIONS

Mashachika Yaguchi, Yokohama, and Kenji Nakamura, Kamakura, both of Japan, assignors to Dai Nippon Toryo Kabushiki Kaisha, Osaka, Japan

Filed Aug. 30, 1974, Ser. No. 501,923
Claims priority, application Japan, Aug. 31, 1973, 48-97216; Aug. 31, 1973, 48-97217
Int. Cl.² C09K *3/34;* **G02F** *1/13*
U.S. Cl. 252—299 **10 Claims**

1. A nematic liquid crystal composition with positive dielectric anisotropy which comprises a mixture of 2% to 50% by weight of at least one of compounds represented by the formula,



wherein X_1 is halogen or a nitro group, X_2 is hydrogen or —R or —OR radicals wherein R is an alkyl group of 1 to 18 carbon atoms, and Y is

and 50% to 98% by weight of a nematic liquid crystal material.

3,989,640
CORROSION INHIBITOR COMPOSITION

Martin J. Culver, and Howard R. Stopper, both of Cincinnati, Ohio, assignors to The Drackett Company, Cincinnati, Ohio

Filed June 15, 1973, Ser. No. 370,309
Disclosure was also published under second Trial Voluntary Protest Program on Jan. 20, 1976
Int. Cl.² C23F *11/14, 11/12;* **C11D** *7/30;* **C23G** *5/02*
U.S. Cl. 252—364 **15 Claims**

4. An aqueous composition consisting essentially of a chlorinated hydrocarbon solvent, water present in greater than trace amounts, and at least 2 weight percent based upon the weight of said solvent-water composition of a three component corrosion inhibitor composition consisting essentially of morpholine, ammonium benzoate, and a member selected from the group consisting of cyclohexene, nitropropane, and cyclopentene, wherein the weight ratio of morpholine to ammonium benzoate to said member is 1:1:2 or 4:1:1.

8. An aqueous composition consisting essentially of a chlorinated hydrocarbon solvent, water present in greater than trace amounts, and at least 2 weight percent based upon the weight of said solvent-water composition of a three component corrosion inhibitor composition consisting essentially of ammonium benzoate, butylene oxide, and a member selected from the group consisting of isopropylamine and triethylamine, wherein the weight ratio of ammonium benzoate to butylene oxide to said member is 1:2:1 or 1:1:4.

3,989,641
OLEFINE POLYMERIZATION CATALYST

James Frank Robert Jaggard, Bad Kissingen, Germany, assignor to Imperial Chemical Industries Limited, London, England

Filed Jan. 20, 1975, Ser. No. 542,403
Claims priority, application United Kingdom, Jan. 31, 1974, 4573/74
Int. Cl.² B01J *31/02*
U.S. Cl. 252—429 B **9 Claims**

1. An olefine polymerisation catalyst comprising

1. at least one solid halide compound of transition metal of Groups IVA to VIA

2. at least one organo-metallic compound of aluminium or of a non-transition metal of Groups IA or IIA;

3. at least one tetra-alkyl diamine of the general formula $R_2NC_nH_{2n}NR_2$

where each R, which may be the same or different, is an alkyl group; and *n* is 1, 2 or 3; and

4. at least one phosphorus compound of the general formula

$R'_3P(O)$,

where each R', which may be the same or different, is a dialkylamino group or a hydrocarbyl group;

wherein for each mole of component (1) there is present

a. from 0.1 up to 20 moles of component (2), and

b. from 0.5 up to 6 moles of component (3) and/or component (4),

which quantity of component (3) and/or component (4) has not been ground with component (1), and the total quantity of moles of components (3) and (4) is less than the number of moles of the organo-metallic compound which is component (2); and component (1) has been modified by grinding it in the presence of at least one of the components (3) and (4) in an amount of from 0.01 up to 0.5 moles of components (3) and/or (4) for each mole of component (1).

3,989,642

POLYMERIZATION CATALYST

Arnaldo Roggero; Alessandro Mazzei, and Antonio Proni, all of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., San Donato Milanese, Italy

Continuation-in-part of Ser. No. 339,939, March 9, 1973, abandoned. This application Sept. 24, 1975, Ser. No. 616,245

Claims priority, application Italy, Mar. 11, 1972, 21728/72

Int. Cl.² C08F *4/46, 4/48, 4/50, 4/52*

U.S. Cl. 252—431 N **4 Claims**

1. Polymerization catalyst constituted by the reaction product of a component which is a metal, metal hydride, metal alkyl or metal amide of a metal selected from the group consisting of the metals of groups IA, IIA and IIIA of the periodic system with a compound represented by the formula:

$$R-(X-(R')_m)_n-Y-R''$$

wherein X and Y, equal or different, are SO or SO_2; R and R'' are members of the group consisting of methyl, alkyl radicals containing from 2 to 10 carbon atoms, cycloalkyl, aryl, arylalkyl and alkyl cycloalkyl radicals; R' is a bivalent arylenic, cycloalkylenic, alkylarylenic, alkylcycloalkylenic radical or a methylenic chain having from 1 to 20 carbon atoms; *m* is between 0 and 1; and *n* is 1, 2 or 3; in the ratio of the component to the compound of between 10:1 and 0.3:1.

3,989,643

RUBBER COMPOUND ADDITIVE

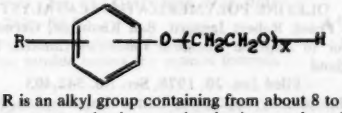
Erwin Aron, Clifton, N.J., assignor to Technical Processing, Inc., Paterson, N.J.

Filed Aug. 28, 1974, Ser. No. 501,447

Int. Cl.² B01J *31/12*

U.S. Cl. 252—431 C **6 Claims**

1. A composition consisting essentially of a zinc salt of a fatty acid having from about 10 to about 20 carbon atoms dispersed throughout an alkylphenoxy polyglycol having the structural formula:



wherein R is an alkyl group containing from about 8 to about 12 carbon atoms and x is a number having a value of from about 2 to about 10, wherein the concentration of said zinc salt in said composition is from about 50 to about 80 weight percent.

3,989,644

RADIATION CURABLE INKS

Donald A. Bolon, Scotia; Gary M. Lucas, Schenectady, both of N.Y., and Mary S. Jaffe, Cleveland Heights, Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Sept. 27, 1974, Ser. No. 509,823

Int. Cl.² H01B *1/02*

U.S. Cl. 252—514 **10 Claims**

1. A radiation curable screen printable ink comprising by volume

A. 10% to 60% of a radiation curable organic resin binder, and

B. 90% to 40% of electrically conductive silver or copper containing particles having up to about 15% by weight of metal particles with an aspect ratio of diameter-to-thickness of a value greater than 20, where (A) is a radiation curable organic resin having from 0.5% to 10% by weight of a non-ionic organic surfactant.

3,989,645

PROCESS FOR PREPARING A HEAVY CRUDE CONVERSION CATALYST

Fred M. Long, and Willard H. Sawyer, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 440,302, Feb. 7, 1974, abandoned. This application Dec. 16, 1974, Ser. No. 533,311

Int. Cl.² B01J *21/04, 23/10, 23/84*

U.S. Cl. 252—462 **52 Claims**

1. A process for the synthesis and preparation of a catalyst support having a relatively high concentration of pores of uniformly large diameter, high surface area and pore volume comprising

dispersing an aluminum halide salt in an aqueous or alcohol medium in molar ratio of water; aluminum halide or alcohol:aluminum halide ranging from about 15:1 to about 30:1 and, while maintaining the temperature within a range of from about 30° F. to about 100° F., adding olefin oxide in molar ratio of olefin oxide:halide of from about 1.5:1 to about 2.0:1 while maintaining a pH in the range of from about 5-8 to effect removal of the halide from solution and form a sol,

raising the solution to substantially ambient temperature or higher to form a gel which separates from its syneresis liquid,

aging the gel while in contact with syneresis liquid for a period sufficient to increase the strength of the gel without significant adverse shrinkage of the size of the pores developed in the gel,

separating the gel from the syneresis liquid,

drying to gel to a solids content ranging from about 12 to about 40 weight percent,

extruding the gel through a die to form an extrudate,

drying said extrudate as required to a solids content ranging above about 25 weight percent,

washing,

drying,

calcining, and

then recovering a product.

3,989,646

SYNTHETIC LAVANDIN OIL

Levy A. Canova, Jacksonville, Fla., assignor to SCM Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 772,026, Oct. 30, 1968, abandoned. This application Jan. 29, 1971, Ser. No. 111,156

Int. Cl.² C11B *9/00*

U.S. Cl. 252—522 **3 Claims**

1. In a synthetic lavandin oil composition having a distinct and pleasant lavandin-like fragrance, said composition containing by weight between about 35 to 45% linalool, 18to 25% linalyl acetate, and natural lavandin oil ingredients other than methyl-n-hexyl ether, the improvement which comprises:

employing as a major portion of said linalool and linalyl acetate the substantially optically inactive form thereof having a specific rotation not more than ± 0.1°, and including in said composition between about 0.1 to 1% by weight of methyl-n-hexyl ether.

3,989,647

QUICK LATHERING TOILET BARS AND METHOD OF MAKING SAME

Leon M. Prince, Westfield, N.J., assignor to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 137,288, April 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 54,008, July 10, 1970, abandoned. This application Nov. 28, 1973, Ser. No. 419,558

Int. Cl.² C11D 1/12

U.S. Cl. 252—535 8 Claims

1. A non-mushing high lathering synthetic toilet bar having a pH of about 4.5–9.5 and comprising based on the total weight of actives:

i. 40% to about 85% of a primary alkane sulfonate or a mixture of alkane sulfonates wherein the carbon chain contains 12 carbon atoms or averages 12 carbon atoms;

ii. 5 to about 35% of a natural or synthetic fatty acid or mixtures thereof wherein the carbon chain contains 12 carbon atoms or averages 12 carbon atoms;

iii. 5 to about 30% of a binder modifier selected from the group consisting of:

alkali metal, magnesium or ammonium salts of C_{10}–C_{16} acyl isethionates, alkali metal, magnesium or ammonium salts of C_8–C_{14} alkylsulfosuccinates, and mixtures thereof; and

iv. based on the total weight of the bar, 5–25% water.

3,989,648

DYE COATED CARRIER WITH TONER

Myron James Lenhard, and Joseph Mammino, both of Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 218,014, Jan. 14, 1972, abandoned. This application Dec. 17, 1973, Ser. No. 425,438

Int. Cl.² G03G 9/02

U.S. Cl. 252—62.1 P 12 Claims

1. An electrostatographic developer mixture comprising finely divided toner particles electrostatically clinging to the surface of carrier particles having an average particle diameter from between about 1 micron and about 1,000 microns, said carrier particles comprising solid particles selected from the group consisting of metals, metal alloys, metal compounds, and mixtures thereof coated with an adsorbed layer of an organic dye, which layer of dye ennables said carrier particles to assume an electrostatic charge opposite to that on said toner particles.

3,989,649

PROCESS FOR PRODUCTION OF SPHERICAL POROUS FILLERS FOR LIQUID CHROMATOGRAPHY BY SUSPENSION POLYMERIZATION OF MONOVINYL AND POLYVINYL AROMATIC MONOMERS IN THE PRESENCE OF PARAFFIN WAX

Isao Kaiho, Yokohama, and Ryuji Takahashi, Tokyo, both of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

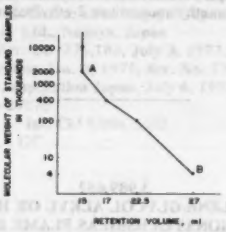
Filed June 3, 1975, Ser. No. 583,357

Claims priority, application Japan, June 4, 1974, 49-62577

Int. Cl.² C08J 9/00; C08F 112/00; C08L 95/00

U.S. Cl. 260—2.1 R 15 Claims

1. A process for the production of spherical porous polymer fillers for liquid chromatography which comprises dissolving a paraffin wax in a mixture of up to 95% by weight of at least one monovinyl aromatic monomer and at least 5% by weight of at least one polyvinyl aromatic monomer to obtain a homogeneous oil phase, dispersing said oil phase into an aqueous medium to form an aqueous suspension of fine oil phase particles, subjecting said monomers to an aqueous suspension polymerization in the presence of a free-radical generating polymerization initiator to form a cross-linked polymer containing paraffin wax deposited as fine particles therein and thereafter removing the paraffin wax from said cross-linked



polymer. and, fillers if desired, introducing ion exchange groups into the polymer

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3,989,650

PROCESS FOR THE PRODUCTION OF ANION EXCHANGERS - AMIDOALKYLATION OF CROSSLINKED WATER INSOLUBLE AROMATIC-GROUP CONTAINING POLYMERS USING ESTERS OF CYCLIC N-HYDROXYALKYLIMIDES

Michael Lange, and Günter Naumann, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Apr. 16, 1975, Ser. No. 568,604

Claims priority, application Germany, Apr. 19, 1974, 2418976

Int. Cl.² C08F 8/02

U.S. Cl. 260—2.1 E 2 Claims

1. In the process for producing a water-insoluble synthetic resin with anion exchange properties by introducing aminoalkyl groups into a crosslinked, water-insoluble organic polymer containing aromatic nuclei wherein said organic polymer is reacted in the presence of a swelling agent for the polymer and in the presence of an acid catalyst with an amidoalkylating agent and the amidoalkylated reaction product is subsequently hydrolyzed, the improvement comprising using as amidoalkylating agent, an ester of a cyclic N-hydroxyalkylimide of an aliphatic or aromatic dicarboxylic acid, the esterifying acid of said ester being a lower aliphatic or aromatic monocarboxylic or dicarboxylic acid or an inorganic oxygen-containing acid and the molar ratio of ester to aromatic nuclei in the crosslinked polymer being from 0.5:1 to 4:1.

3,989,651

CATALYST FOR SPRAYABLE POLYISOCYANURATE FOAM COMPOSITION

Robert J. Lockwood, East Haven, and Richard H. Roess, Clinton, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed July 9, 1974, Ser. No. 486,828

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² C08G 18/14, 18/18; B32B 27/40

U.S. Cl. 260—2.5 AW 8 Claims

1. A process for the preparation of a composition capable of being sprayed to form a foam in which the major recurring polymer unit is isocyanurate, which process comprises bringing together in the presence of a blowing agent under spray foam conditions:

a. an aromatic polyisocyanate;

b. a minor amount of polyol; and

c. a catalyst for trimerizing said polyisocyanate comprising:

i from about 0.002 to about 0.0315 equivalent per equivalent of said polyisocyanate of N,N-dimethylcyclohexylamine; and

ii. from about 0.0055 to about 0.022 equivalent per equivalent of said polyisocyanate of a tetra (lower-

alkyl) ammonium lower alkanoic acid salt selected from the group consisting of tetramethylammonium acetate, tetraethylammonium acetate, tetramethylammonium propionate, tetramethylammonium octanoate, and tetramethylammonium 2-ethylhexanoate.

3,989,652

POLYALKYLENE GLYCOL ALKYL OR HALOALKYL POLYPHOSPHONATES USED AS FLAME RETARDANTS IN POLYURETHANE FOAM

Kyung S. Shim, Irvington, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

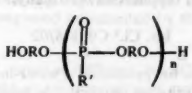
Continuation of Ser. No. 282,642, Aug. 21, 1972, Pat. No. 3,855,360. This application Sept. 3, 1974, Ser. No. 502,589

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

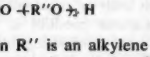
Int. Cl.² C08G *18/14, 18/50*

U.S. Cl. 260—2.5 AR 9 Claims

1. A flame retardant polyurethane foam containing as a chemically bonded integral part thereof, the residue of a polyalkylene glycol alkyl or haloalkyl polyphosphonate characterized by an acid number in water of below about 15 mg. of KOH per gram of sample, having the formula:



wherein R is the residue of a polyalkylene glycol having the formula:



wherein R'' is an alkylene radical of 2 to about 20 carbon atoms and x is a number from 2 to about 20, R' is alkyl or haloalkyl and n is a number in the range from about 2 to about 50.

3,989,653

DIESTERS OF TETRABROMOPHTHALIC ANHYDRIDE

James P. Baldino, Haddonfield, N.J., and Joseph Feltzin, Wilmington, Del., assignors to ICI United States Inc., Wilmington, Del.

Division of Ser. No. 361,476, May 18, 1973, Pat. No. 3,929,866. This application May 23, 1975, Ser. No. 580,041

Int. Cl.² C07C *69/80;* C08G *18/06;* C09K *3/28*

U.S. Cl. 260—2.5 AJ 8 Claims

1. A polyol blend comprising a simple diester of tetrabromophthalic anhydride and a polyhydric alcohol selected from the group consisting of trimethylol propane, pentaerythritol, glycerol, the reaction product of propylene oxide and sorbitol, the reaction product of ethylene oxide and sorbitol, arabitol, xylitol, adonitol, mannitol, dulcitol, sorbitol, 1,2,4-benzenetriol, phloroglucinol, 1,2,3,5-benzenetetrol, 1,2,4,5-benzenetetrol, and benzenehexol, wherein the molar ratio of polyhydric alcohol to tetrabromophthalic anhydride is equal to 2 to 1, and a condensate prepared by reacting an alkylene oxide with a polyhydric alcohol.

3,989,654

PROCESS FOR PREPARING CIS-CHRYSANTHEMIC ACID

Toshiko Honda, Osaka; Nobushige Itaya; Akio Higo, both of Nishinomiya, and Fukashi Horiuchi, Kawanishi, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

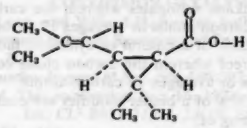
Filed Aug. 23, 1974, Ser. No. 500,018

Claims priority, application Japan, Nov. 22, 1973, 48-131988; Nov. 30, 1973, 48-135976

Int. Cl.² C07C *61/04*

U.S. Cl. 260—514 H 1 Claim

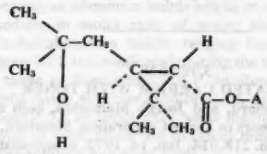
1. A process for preparing cis-chrysanthemic acid of the formula (I)



(I)

which comprises

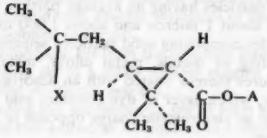
preparing a trans-δ-hydroxydihydrochrysanthemic acid ester of the formula (V)



(V)

wherein A represents C_1–C_4 alkyl or benzyl

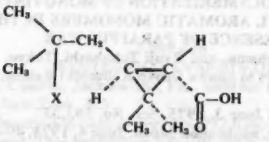
by either hydrolyzing an ester of trans-δ-halogenodihydrochrysanthemic acid of the formula (VI)



(VI)

wherein X is a halogen atom under neutral conditions maintained by the presence of calcium carbonate or magnesium carbonate or

by hydrolyzing a trans-δ-halogenodihydrochrysanthemic acid of the formula (VIII)

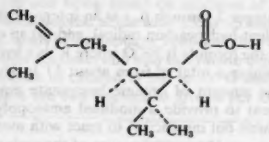


(VIII)

wherein X is a halogen atom under neutral conditions maintained by the presence of calcium carbonate or magnesium carbonate with further esterifying said hydrolyzed acid with an alcohol of the formula A-OH wherein A is defined above in the presence of a mineral acid at about room temperature,

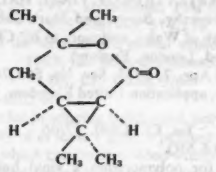
reacting said trans-δ-hydroxydihydrochrysanthemic acid ester of the formula (V) with more than an equimolar amount of a strong base selected from the group consisting of alkali metal alkoxide, alkali metal hydride, alkali metal amide and alkali metal in the presence or absence of an inert solvent at a temperature ranging from 100° C

to 200° C to prepare a mixture of cis-chrysanthemic acid of the formula (I) and iso-cis-chrysanthemic acid of the formula (III)



(III)

treating said mixture with water in the presence of an acid catalyst, in the presence or absence of an inert solvent to convert iso-cis-chrysanthemic acid of the formula (III) selectively to cis-dihydrochrysanthemolactone of the formula (II)



(II)

and separating the acid part from the neutral part by adding an aqueous alkaline agent to the resulting mixture and removing the lactone of the formula (II) as the neutral part according to an ordinary method.

3,989,655

LOW SHRINK, FREE FLOWING POLYESTER RESIN SYSTEMS BASED ON A MIXTURE OF A CRYSTALLINE UNSATURATED POLYESTER RESIN, A MONOMERIC COPOLYMERIZABLE COMPONENT AND A CELLULOSE ESTER

Hans Rudolph; August Böckmann, both of Krefeld; Leonhard Goerden, Grefrath; Oskar Walter, Krefeld, and HansJochen Schulz-Walz, Meerbusch, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation-in-part of Ser. No. 377,551, July 9, 1973, abandoned. This application Jan. 17, 1974, Ser. No. 434,012
Claims priority, application Germany, Nov. 2, 1973, 2354716
Int. Cl.² C08L *1/14*
U.S. Cl. 260—16 **5 Claims**

1. A free-flowing moulding composition comprising

a. 24–70% by weight of an unsaturated crystalline polyester resin which is the condensation product of fumaric acid and a glycol of the formula

$$HO-CH_2-R-CH_2-OH$$

wherein R is $(CH_2)_z$ wherein z is 1 to 18, or a symmetrical dialkyl derivative of $(CH_2)_z$ whose alkyl substituents are situated on the same carbon atom or cycloalkyl;

b. 20–75% by weight of styrene and

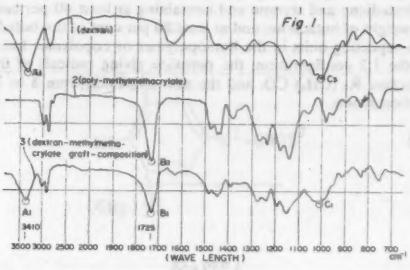
c. 1–30% by weight of a cellulose ester of at least one organic acid having 2 to 4 carbon atoms.

3,989,656

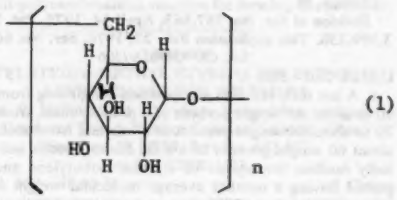
DEXTRAN-ALKYL METHACRYLATE GRAFT COMPOSITION FOR CONTACT LENS AND CORNEAS

Sadayoshi Kamiya; Tokihiko Yamamoto; Yasuhiko Onishi, and Shusaburo Hokkoku, all of Nagoya, Japan, assignors to Karme Company Ltd., Nagoya, Japan

Continuation of Ser. No. 376,183, July 3, 1973, abandoned. This application Jan. 6, 1975, Ser. No. 539,151
Claims priority, application Japan, July 6, 1972, 47-67965; Mar. 8, 1973, 48-27275
Int. Cl.² C08L *5/02*
U.S. Cl. 260—17.4 GC **5 Claims**

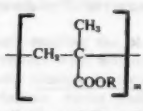


1. A contact lens consisting essentially of a graft copolymer composition which consists essentially of a dextran unit of the formula



(1)

wherein *n* is an integer of 5 to 150,000 and a poly(alkyl methacrylate) unit of the formula



(2)

wherein *m* is an integer of 50 to 20,000, R is an alkyl group having 1 to 4 carbons, and the ratio of formula (2) unit to formula (1) unit is 50 to 3000% by weight, with the proviso that the graft composition is water- and acetone- insoluble at 25° C., the composition having been heated to from about 170° to 230° C. under a pressure of about 50 to 150 kg/cm².

3,989,657

STABILIZATION OF POLYBUTADIENE RESIN WITH METAL SALT

Delmar F. Lohr, Jr., and Edward Leo Kay, both of Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Nov. 13, 1972, Ser. No. 306,067
Int. Cl.² C08L *91/00*
U.S. Cl. 260—23.7 M **33 Claims**

1. Process of producing a resin composition having a high resistance to deterioration of its mechanical properties upon prolonged exposure to heat, which comprises subjecting to

curing temperatures a composition containing

	Parts by Weight
A butadiene polymer or copolymer resin	100
A metal salt of an organic sulfonic acid	0.5 – 6.0
A peroxide curing agent	0.5 – 6.0

the resin being a homopolymer of butadiene or a copolymer of butadiene and styrene and containing at least 40 per cent by weight of butadiene, and at least 80 per cent of the butadiene repeating units in the homopolymer or copolymer being in the 1,2 configuration, the peroxide giving radicals of the structure $R_2(CH_3)CO$; and the salt containing from 8 to 26 carbon atoms.

3,989,658

HOT MELT RESINOUS COMPOSITION COMPRISING A PRIMARY RESIN, A WAX AND A TERPOLYMER OF STYRENE, ISOBUTYLENE AND BETA-PINENE

Takeo Hokama, Chicago, Ill., and Frank Scardiglia, Woodcliff Lake, N.J., assignors to Velsicol Chemical Corporation, Chicago, Ill.

Division of Ser. No. 567,563, April 14, 1975, Pat. No. 3,959,238. This application Feb. 25, 1976, Ser. No. 661,080

Int. Cl.² C08L 91/06

U.S. Cl. 260—28.5 A 5 Claims

1. A hot melt resinous composition comprising from about 10 to about 65 weight percent of a primary resin, from about 20 to about 80 weight percent of a wax and from about 10 to about 60 weight percent of a solid homogeneous and essentially random terpolymer of styrene, isobutylene and beta-pinene having a number average molecular weight of from about 1500 to about 7000, a styrene content of from about 40 to about 60 weight percent, an isobutylene content of from about 10 to about 40 weight percent, a beta-pinene content of from about 10 to about 40 weight percent and a ring and ball softening point of from about 160° F to about 240° F.

3,989,659

WATER-DISPERSIBLE THERMOSETTABLE CATIONIC RESINS AND PAPER SIZED THEREWITH

Paul H. Aldrich, Greenville, and David H. Dumas, Hockessin, both of Del., assignors to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 393,690, Aug. 31, 1973, Pat. No. 3,922,243. This application Apr. 28, 1975, Ser. No. 572,595

Int. Cl.² C08L 77/06; C08G 69/48

U.S. Cl. 260—29.2 EP 4 Claims

1. A composition consisting essentially of an aqueous dispersion of a water-insoluble, water-dispersible thermosettable cationic resin derived by reacting (I) an epihalohydrin and (II) a water-insoluble modified aminopolyamide derived by reacting (a) a water-soluble long chain aminopolyamide derived by reaction of a polyalkylenepolyamine and a dicarboxylic acid, said aminopolyamide having recurring groups

$$-\mathrm{N}(\mathrm{C}_n\mathrm{H}_{2n}\mathrm{N})_x-\mathrm{CORCO}-$$

wherein n is an integer 2 through 6, x is an integer 2 through 4, and R is a divalent hydrocarbon radical, and (b) an organic isocyanate having the formula R'NCO where R' is a hydrocarbon radical containing a total of from about 11 to about 39 carbon atoms, the amount of organic isocyanate employed being that sufficient to provide a modified aminopolyamide that is water-insoluble but insufficient to react with more than about 50% of the secondary amine groups of the aminopolyamide, the amount of epihalohydrin employed being at least that amount sufficient to react with substantially all the secondary amine groups of the modified aminopolyamide.

3,989,660

POLYMERIZATION OF VINYL HALIDES

Peter John Goldsworthy, Barry, and Mark John Scudamore, Sigginstone, both of Wales, assignors to BP Chemicals International Limited, London, England

Filed Apr. 7, 1975, Ser. No. 565,749

Claims priority, application United Kingdom, Apr. 16, 1974, 16654/74

Int. Cl.² C08L 27/06

U.S. Cl. 260—29.6 MQ 10 Claims

1. A process for polymerizing a vinyl halide-containing monomeric material which comprises first dissolving a monomer-soluble surfactant in said monomeric material, then bringing said solution into contact with an aqueous phase, homogenizing said mixture, and polymerizing said monomeric material in the presence of a monomer-soluble initiator.

3,989,661

METHOD FOR ENLARGING THE PARTICLE SIZE OF POLYMERS PREPARED BY AQUEOUS EMULSION POLYMERIZATION

Clemens Bondy, Harlow, England, assignor to Revertex Ltd., Harlow, England

Filed May 7, 1973, Ser. No. 358,260

Claims priority, application United Kingdom, May 12, 1972, 22507/72

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² C08L 21/02, 25/10, 27/08, 27/22

U.S. Cl. 260—29.7 PT 14 Claims

1. A method for enlarging the particle size of stabilized latices of water-immiscible polymers prepared by aqueous emulsion polymerization, wherein the dispersed polymer particles in the latex are less than completely covered by agglomerating surfactant, which comprises admixing with said latex at a temperature which is above the glass transition temperature of a major proportion of the polymer contained in the latex a polyethoxylated agglomerating surfactant having an HLB number of from 16 to 19.5 which surfactant is a full ester of aliphatic polyol and one or more long chain fatty acids at least one of which acids contains an ethoxylatable substituent group.

3,989,662

SINGLE COMPONENT POLYURETHANE VARNISH OF LONG SHELF LIFE

Karl Schmitt; Josef Disteldorf, and Werner Flakus, all of Herne, Germany, assignors to Veba-Chemie AG, Gelsenkirchen-Buer, Germany

Filed Mar. 27, 1974, Ser. No. 455,152

Claims priority, application Germany, Mar. 30, 1973, 2315910

Int. Cl.² C08G 18/46

U.S. Cl. 260—31.2 N 8 Claims

1. Single-component polyurethane varnishes having long shelf life comprising polyurethane solvents and the reaction

product of 3-isocyanatomethyl-3,5,5-trimethylcyclohexylisocyanate with branched, hydroxyl-terminal-group-containing polyesters, said polyesters having tin incorporated in the molecule and being based on mixtures of aliphatic and aromatic dicarboxylic acids with 15 to 85 mole-% of the dicarboxylic acids being aliphatic acids and the remainder aromatic acids, said polyester and said isocyanate being reacted without the addition of catalyst at 10° to 35° C and in such quantities that there are two isocyanate groups per OH group.

3,989,663

SOLID, RAPID-SETTING RIGID POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 405,244, Oct. 10, 1973, which is a continuation-in-part of Ser. No. 327,630, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 221,784, Jan. 28, 1972, abandoned. This application May 5, 1975, Ser. No. 574,210

The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.

Int. Cl.² C08K 5/06

U.S. Cl. 260—33.2 R **12 Claims**

1. A process for producing solid, rigid, polyurethane articles having a density of at least 1 g/cc, a percent elongation of less than 100, and which can be demolded within a period of about 5 minutes without the addition of an external source of heat, which process comprises

1. admixing, in the absence of a catalytic quantity of a catalyst for urethane formation, the components of a composition comprising
   - A. an amine initiated polyol having an OH equivalent weight of from about 50 to less than about 250;
   - B. an organic aromatic polyisocyanate;
   - C. a liquid modifier having a boiling point above about 150° C selected from nonhydroxyl-containing polyoxyalkylene compounds and mixtures thereof; wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1 and component (C) is employed in quantities of from about 5% to about 60% by weight of the combined weights of components (A), (B) and (C);
2. placing the admixed composition into a suitable mold wherein said composition solidifies within less than about 5 minutes to a solid having a density of at least 1 g/cc and a percent elongation of less than 100; and
3. subsequently demolding the resultant article from the mold.

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STABILIZED POLYESTER COMPOSITION AND METHOD FOR STABILIZING POLYESTER

Shoji Kawase; Hiroo Inata, and Takeo Shima, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

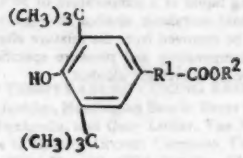
Continuation-in-part of Ser. No. 548,988, Feb. 10, 1975, which is a division of Ser. No. 417,918, Nov. 21, 1973, Pat. No. 3,904,578. This application Apr. 21, 1975, Ser. No. 569,687

Claims priority, application Japan, Nov. 24, 1972, 47-117095

Int. Cl.² C08K 5/13

U.S. Cl. 260—45.85 B **12 Claims**

1. A stabilized polyester composition wherein said polyester is formed by melt-polycondensation comprising a polyester, at least 80% of the recurring units of which in terms of number, consists of tetramethylene terephthalate units or tetramethylene 2,6-naphthalate units, wherein said polyester is derived from the melt state reaction between dicarboxylic acid component, at least 80 mol% of which consists of terephthalic acid, naphthalene-2,6-dicarboxylic acid or their polyester-forming derivatives and up to 20 mol% of a dicarboxylic acid component selected from naphthalene-2,6-dicarboxylic acid when the main component is terephthalic acid, terephthalic acid when the main component is naphthalene-2,6-dicarboxylic acid, isophthalic acid, naphthalene-2,7-dicarboxylic acid, naphthalene-1,5-dicarboxylic acid, 4,4'-diphenyldicarboxylic acid, 4,4'-diphenoxyethanedicarboxylic acid, p-hydroxypenzoic p-hydroxybenzoic sebacic acid, and adipic acid and a glycol component at least 80 mol% of which consists of tetramethylene glycol or its polyester-forming derivatives and not more than 20 mol% of a glycol component selected from alkylene glycol or cycloakylene glycol and 0.001 to 10% by weight, based on the weight of said polyester, of at least one compound selected from compounds of formula (I)



(I)

wherein R^1 is a divalent organic group, and R^2 is an alkyl or aryl group, wherein said compound of formula (I) is incorporated into said polymer at any stage before the completion of the melt-polycondensation reaction for forming the polyester.

3,989,665

BUTYLATED, α-METHYL STYRENATED PHENOLIC ANTIOXIDANTS FOR POLYMERS

William S. Hollingshead, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 20, 1975, Ser. No. 542,333

Int. Cl.² C08K 5/13

U.S. Cl. 260—45.95 H **2 Claims**

1. A polymer containing an antioxidant amount of the phenolic reaction product prepared by a two-step reaction comprising:

   a. reacting a combination comprising phenol and alpha-methyl styrene in the presence of a Friedel-Crafts catalyst, and
   b. subsequently reacting the phenol/alpha-methyl styrene reaction product with isobutene in the presence of a Friedel-Crafts catalyst, wherein the phenol/alpha-methyl styrene/isobutene molar ratio is from 1:0.5:0.5 to 1:2.5:2.5 and wherein the total molar amount of alpha-methyl styrene plus isobutene charged is from 2.5 to 3.5 moles per mole of phenol.

3,989,666

CROSSLINKER-PLATINUM CATALYST-INHIBITOR AND METHOD OF PREPARATION THEREOF

Randolph G. Niemi, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Dec. 2, 1974, Ser. No. 528,962

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C08G 77/04

U.S. Cl. 260—46.5 UA **20 Claims**

1. A method of preparing a crosslinker-platinum catalyst-inhibitor composition comprising mixing a siloxane having an average of at least three silicon-bonded hydrogen atoms per molecule, an acetylenic alcohol and a platinum catalyst to form a mixture, heating the mixture in a closed system for 10 to 30 hours at a temperature of from 50°C. to 90°C. and

thereafter removing unreacted acetylenic alcohol by applying a reduced pressure of 700 to 750 millimeters of mercury for at least 10 hours at a temperature of from 20°C. to 30°C., said siloxane having an average of at least three silicon-bonded hydrogen atoms per molecule, there being in addition an average of up to two monovalent organic radicals per silicon atom selected from the group consisting of monovalent hydrocarbon radicals free of aliphatic unsaturation and monovalent fluorinated hydrocarbon radicals free of aliphatic unsaturation, the remaining valences of the silicon atoms being satisfied by divalent radicals selected from the group consisting of divalent oxygen atoms, divalent hydrocarbon radicals free of aliphatic unsaturation, divalent hydrocarbon ether radicals free of aliphatic unsaturation and divalent fluorinated arylene radicals wherein at least one divalent radical is a divalent oxygen atom and said divalent radicals linking silicon atoms, said siloxane being liquid at a temperature of 50°C. to 90°C. in said mixture, said acetylenic alcohol having a vapor pressure sufficient to be removed from the mixture after the heating step at the temperature and pressure specified for the removal of unreacted acetylenic alcohol.

3,989,667

OLEFINIC SILOXANES AS PLATINUM INHIBITORS

Chi-Long Lee, and Ollie W. Marko, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Dec. 2, 1974, Ser. No. 528,966

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C08G *77/04*

U.S. Cl. 260—46.5 UA 26 Claims

1. A polyorganosiloxane consisting essentially of from 3 to 10 siloxane units in which

a. at least one siloxane unit is selected from the group consisting of

$$RHSiO \text{ and } R_2HSiO_{0.5} \text{ and}$$

b. at least one siloxane unit is selected from the group consisting of

and

where the sum of siloxane units in (a) and (b) is equal to at least three siloxane units,

c. any remaining siloxane units being selected from the group consisting of

$$R_3SiO_{0.5}, SiO_2 \text{ and } RSiO_{1.5}$$

where each siloxane unit of (c) does not exceed three siloxane units,

where R is a monovalent radical selected from the group consisting of hydrocarbon radicals and perfluoroalkylethylene radicals, both having no more than six carbon atoms and R′ is a monovalent hydrocarbon radical having a secondary or tertiary hydroxy substitution and having no more than ten carbon atoms.

3,989,668

METHOD OF MAKING A SILICONE ELASTOMER AND THE ELASTOMER PREPARED THEREBY

Chi-Long Lee, and Gary M. Ronk, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed July 14, 1975, Ser. No. 595,913

Int. Cl.² C08G *77/04*

U.S. Cl. 260—46.5 G 7 Claims

1. A method of making a silicone elastomer consisting essentially of

mixing a hydroxyl endblocked polydiorganosiloxane having a viscosity of at least 1000 centipoise at 25° C., an organohydrogensiloxane having at least 2.1 silicon-bonded hydrogen atoms per molecule, a platinum catalyst and a platinum catalyst inhibitor selected from the group consisting of acetylenic alcohols and a polyorganosiloxane consisting essentially of from 3 to 10 siloxane units in which (a) at least one siloxane unit is selected from the group consisting of RHSiO and

$$R_2HSiO_{0.5}$$

and (b) at least one siloxane unit is selected from the group consisting of

and

where the sum of siloxane units in (a) and (b) is equal to at least three siloxane units, (c) any remaining siloxane units being selected from the group consisting of

$$R_3SiO_{0.5}, SiO_2 \text{ and } RSiO_{1.5}$$

where each siloxane unit of (c) does not exceed three siloxane units, where R is a monovalent radical selected from the group consisting of hydrocarbon radicals and perfluoroalkylethylene radicals, both having no more than six carbon atoms and R′ is a monovalent hydrocarbon radical having a secondary or tertiary hydroxy substitution and having no more than ten carbon atoms, for each 100 parts by weight of hydroxyl endblocked polydiorganosiloxane there being present a sufficient amount of organohydrogensiloxane to provide a molar ratio of silicon-bonded hydrogen atoms per silicon-bonded hydroxyl radicals of from 1.5 to 4, the amount of platinum catalyst being present such that there is from 1 to 200 parts by weight platinum per 1 million parts by weight room temperature vulcanizable silicone elastomer, and the amount of platinum catalyst inhibitor being present in an amount such that there is present 0.0001 to 0.001 moles inhibitor per 100 grams of hydroxyl endblocked polydiorganosiloxane.

allowing a composition obtained by the mixing procedure to set at room temperature until a cured silicone elastomer is obtained.

3,989,669

POLYIMIDES PREPARED FROM AZO-BISANHYDRIDES OF TRIMELLITIC ANHYDRIDE

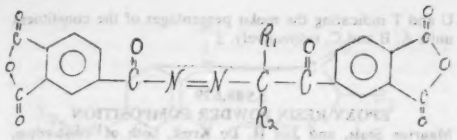
Kerford A. Marchant, Jr., Evanston, and David J. Fenoglio, Carol Stream, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Nov. 9, 1973, Ser. No. 414,351

Int. Cl.² C08G *63/40, 73/10*

U.S. Cl. 260—47 CP 3 Claims

1. A polymer formed by copolymerizing a dianhydride compound of the formula:



wherein R_1 and R_2 are independently selected from the group consisting of alkyl radicals containing from one to six carbon atoms, halogenated alkyl radicals containing from one to six carbon atoms, and phenyl radicals; with at least one diamine of up to 20 carbon atoms.

3,989,670

METHOD FOR MAKING POLYETHERIMIDES

Tohru Takekoshi, Scotia, N.Y., and John E. Kochanowski, Pittsfield, Mass., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 319,372, Dec. 29, 1972. This application Feb. 6, 1974, Ser. No. 439,866

The portion of the term of this patent subsequent to Apr. 9, 1991, has been disclaimed.

Int. Cl.² C08G *69/32*

U.S. Cl. 260—47 CP **4 Claims**

1. A method for making polyetherimide which comprises effecting the removal of water of reaction at temperatures of from about 250° C to a temperature below about 400° C by using either stirring, an inert gas purge, or reduced pressure, from the melt of a mixture containing as essential ingredients m-phenylene diamine and aromatic bis(etheranhydride) selected from the class consisting of 2,2-bis[4-(3,4-dicarboxyphenoxy)phenyl]propane dianhydride, 2,2-bis[4-(2,3-dicarboxyphenoxy)phenyl]propane dianhydride, and 2-[4-(2,3-dicarboxyphenoxy)phenyl]-2-[4-(3,4-dicarboxyphenoxy)-phenyl]propane dianhydride and mixtures thereof, where there is utilized from 0.5 to 2.0 moles of m-phenylene diamine per mole of aromatic bis(etheranhydride).

3,989,671

PROCESS FOR PRODUCING POLYPHENYLENE OXIDES

Eiichi Yonemitsu, Kashiwa; Akitoshi Sugio, Tokyo; Tetsuo Tomita, Tokyo; Tadashi Yoshii, Tokyo, and Akira Ito, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Continuation-in-part of Ser. No. 244,247, April 14, 1972, abandoned. This application Feb. 22, 1974, Ser. No. 445,042

Claims priority, application Japan, Apr. 14, 1971, 46-23034; Apr. 14, 1971, 46-23035

Int. Cl.² C08G *65/44*

U.S. Cl. 260—47 ET **32 Claims**

1. A process for preparing polyphenylene oxides which comprises forming self-condensation products by oxidizing substituted phenols with oxygen or an oxygen containing gas in the presence of a tertiary diamine, the improvement which comprises using a catalytically effective amount of a catalyst which is a combination of a copper compound, capable of forming a chelate ring with said tertiary diamine, with a material which yields iodine or iodine anions in the reaction system.

3,989,672

PROCESS FOR PREPARING AROMATIC CARBONATE POLYMERS

Jorgen Helm Vestergaard, Brasschaat, Belgium, assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 302,252, Oct. 30, 1972, abandoned, which is a continuation-in-part of Ser. No. 28,102, April 13, 1970, abandoned. This application Sept. 23, 1974, Ser. No. 508,110

Int. Cl.² C08G *63/62*

U.S. Cl. 260—47 XA **5 Claims**

1. A process for preparing a carbonate polymer having improved resistance to thermal degradation and improved impact resistance, which process consists of reacting a carbonate precursor with 2,2-bis(4-hydroxyphenyl) propane in an aqueous medium containing sufficient alkali metal hydroxide to maintain a pH between 8.0–10.2 during the reaction.

3,989,673

LOW TEMPERATURE CURING RESIN SYSTEM

Robert K. Jenkins, Huntington Beach; Boyce G. Kimmel, Palos Verdes Peninsula, and Gary Luster, Van Nuys, all of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 30, 1974, Ser. No. 537,819

Int. Cl.² C08G *30/14*

U.S. Cl. 260—47 EN **5 Claims**

1. A low temperature curing epoxy resin system comprised of a polymerizable glycidyl ether epoxy resin and a curing agent consisting of an eutectic mixture of piperidine and an alkyl substituted imidazole.

3,989,674

NOVEL GOLD-COPPER CATALYSTS FOR THE PARTIAL OXIDATION OF OLEFINS

John H. Sinfelt, Berkeley Heights, and Allan E. Barnett, Westfield, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Mar. 26, 1969, Ser. No. 810,846

Int. Cl.² C07C *45/02*

U.S. Cl. 260—604 R **9 Claims**

1. A process for the partial oxidation of an unsubstituted monoolefinic compound, comprising from 3 to 18 carbon atoms, to its corresponding unsaturated carbonyl compound which comprises passing said monoolefinic compound in admixture with oxygen at a temperature in the range of from about 300° to about 700° F. over a catalyst comprising gold and copper, said catalyst having a molar ratio of gold to copper of from about 0.25 to 4.

3,989,675

OXO PROCESS FOR PRODUCING AN ALDEHYDE

Otis C. Taylor, and Lee A. Lemaster, both of Freeport, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 343,925, Jan. 24, 1964, abandoned, which is a division of Ser. No. 64,988, Oct. 26, 1960, abandoned. This application Nov. 24, 1967, Ser. No. 685,278

Int. Cl.² C07C *45/02*

U.S. Cl. 260—604 HF **5 Claims**

1. In a process wherein a lower acyclic olefin, carbon monoxide and hydrogen are reacted in the presence of a cobalt salt to produce an aldehyde, the improvement comprising using as a catalyst a complex of cobalt salt with at least an equimolar amount of triphenyl phosphine, said process being conducted at a temperature of about 150° to 300° C. and a pressure of about 2000 to 5000 p.s.i.

3,989,676

POLYURETHANE COATING FORMULATIONS BASED ON POLYEPOXIDE-CAPROLACTONE POLYOLS AND POLYISOCYANATES

Richard Michael Gerkin, Charleston, and Lowell Ray Comstock, South Charleston, both of W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Division of Ser. No. 415,791, Nov. 14, 1973, Pat. No. 3,896,303. This application May 5, 1975, Ser. No. 574,377

Int. Cl.² C08G 18/34

U.S. Cl. 260—77.5 AN 7 Claims

1. A two-package urethane coating formulation which comprises (1) an organic polyisocyanate, and (2) a polyol composition prepared by the reaction of (a) and (b) where (a) is a caprolactone polyol having an average of at least three hydroxyl groups per molecule and (b) is a polyepoxide having at least two vicinal epoxy groups per molecule, the amount of reactant (a) employed in forming said polyol composition being at least sufficient to effect substantially complete reaction of the epoxy groups of (b).

3,989,677

PROCESS FOR THE PRODUCTION OF POLYAMIDES

Bert Brassat, and Rolf Brockmann, both of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 15, 1974, Ser. No. 524,272

Claims priority, application Germany, Nov. 17, 1973, 2357568

Int. Cl.² C08G 69/46

U.S. Cl. 260—78 L 9 Claims

1. In a process for the production of polyamides of low extract content by activated anionic polymerisation of at least one lactam containing at least 5 ring members at a temperature above the melting point of the polyamide in a continuously working polymerisation apparatus comprising an extruder, the improvement comprising treating the polyamide melt obtained by polymerising said lactam in said extruder with water or steam for an average time of from about 0.5 to about 5 minutes before the polyamide melt is discharged into the open; and subsequently freeing the melt from volatile constituents by evaporation.

3,989,678

HOT MELT ADHESIVES COMPRISING COPOLYMERIC POLYAMIDES

Kaoru Furukawa; Shinichiro Seki; Takashi Akiyama; Singo Ueda, and Hideo Ikeda, all of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Sept. 13, 1973, Ser. No. 396,809

Claims priority, application Japan, Sept. 13, 1972, 47-92084

Int. Cl.² C08G 69/36

U.S. Cl. 260—78 L 4 Claims

1. A copolyamide useful as a hot melt adhesive, and having improved tear strength, washability and dry-cleanability properties, consisting essentially of units derived from the polycondensation of (1) ϵ-caprolactam, (2) (a) hexamethylenediamine and (b) an aliphatic dicarboxylic acid selected from the group consisting of azelaic acid, sebacic acid and dodecanedioic acid in a substantially equimolar ratio and (3) (a) at least one of 2,2,4-trimethylhexamethylenediamine and 2,4,4-trimethylhexamethylenediamine and (b) an aliphatic dicarboxylic acid selected from the group consisting of azelaic acid, sebacic acid and dodecanedioic acid in a substantially equimolar ratio, the proportion of the constituent unit A essentially consisting of the component (1), the constituent unit B essentially consisting of the components (2) (a) and (2) (b) and the constituent unit C essentially consisting of the components (3) (a) and (3) (b) being within the tetragon circumscribed by the lines connecting the points P (82/17/1), Q (52/47/1), U (10/46/44) and T (86/7/7) in the graph shown in FIG. 2 of the accompanying drawing, the numerals in the parentheses following P, Q, U and T indicating the molar percentages of the constituent units A, B and C, respectively.

3,989,679

EPOXY RESIN POWDER COMPOSITION

Maarten Sluis, and Jan H. De Kruif, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jan. 31, 1975, Ser. No. 546,170

Claims priority, application United Kingdom, Feb. 4, 1974, 5041/74

Int. Cl.² C08F 18/14; C08G 59/14, 59/20

U.S. Cl. 260—78.41 7 Claims

1. An epoxy resin composition, solid at 25° C and fusible and curable at temperatures above about 150° C, comprising (A) a solid, fusible reaction product of (1) a polyglycidyl ester having from 1.5 to 2.0 epoxy groups per molecule of a carbocyclic dicarboxylic acid and (2) a dicarboxylic acid component containing from about 0% to 50% by weight of at least one aliphatic or cycloaliphatic dicarboxylic acid having at least 6 carbon atoms per molecule and from about 50 to 100% by weight of isophthalic acid, said reaction product having an epoxy equivalent weight of from about 800 to 3000 and being prepared by reacting components A (1) and A (2) in the epoxy/carboxy equivalent ratio of from 1.5:1 to 1.08:1.0 at a temperature of from about 100° to 150° C and (B) a curing amount of a polycarboxylic acid or anhydride thereof containing from about 50 to 100 percent by weight of an aromatic polycarboxylic acid or anhydride thereof having at least three carboxyl functions per molecule.

3,989,680

3,3-DIALKYL-1-(SUBSTITUTED-PHENYL) TRIAZENE-1-OXIDES

John L. Miesel, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

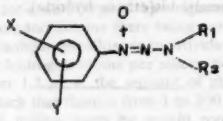
Filed Sept. 6, 1974, Ser. No. 503,579

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² C07C 107/04

U.S. Cl. 260—140 R 12 Claims

1. A compound of the formula:



wherein R_1 and R_2 taken separately are C_1-C_3 alkyl or R_1 and R_2 taken together with the nitrogen to which they are attached form a heterocyclic group selected from the class consisting of piperidino, C_1-C_3 alkylpiperidino, di-(C_1-C_3 alkyl)piperidino, morpholino, and 3-(2-oxo-oxazolidino);

X is hydrogen, halo, nitro, C_1-C_3 lower alkoxy, C_1-C_3 lower dialkylamino, trifluoromethyl or C_1-C_3 lower alkyl, and Y is hydrogen, C_1-C_3 lower alkyl, halo or C_1-C_3 lower alkoxy.

3,989,681

7-AZOXY SUBSTITUTED-1,4-BENZODIAZEPIN-2-ONES

Rodney Ian Fryer, North Caldwell, and Armin Walser, West Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

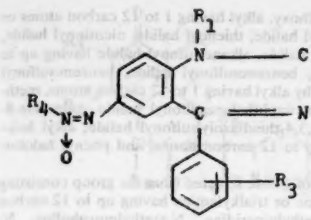
Filed Nov. 28, 1973, Ser. No. 419,582

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² C07C 107/04

U.S. Cl. 260—143 3 Claims

1. A compound of the formula



wherein

R_1 is selected from the group consisting of hydrogen, lower alkyl, C_3 to C_7 cycloalkyl-lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl and dilower alkylamino-lower alkyl;

R_2 signifies hydrogen or lower alkyl;

R_3 signifies hydrogen or halogen;

R_4 signifies lower alkyl

or the pharmaceutically acceptable acid addition salts thereof.

3,989,682

PROCESS FOR PREPARING 2-THIOADENOSINE

Hideo Suehiro; Kiyomi Kikugawa, both of Kokubunji; Motonobu Ichino, and Tokuro Nakamura, both of Mitaka, all of Japan, assignors to Kohjin Co., Ltd., Tokyo, Japan

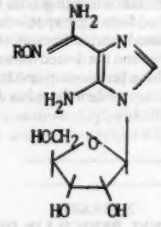
Filed July 14, 1975, Ser. No. 595,834

Claims priority, application Japan, July 12, 1974, 49-79239; Oct. 28, 1974, 49-123441; Jan. 7, 1975, 50-4259; May 26, 1975, 50-61921

Int. Cl.² C07H *19/22*

U.S. Cl. 536—23 4 Claims

1. A process for preparing 2-thioadenosine comprising reacting a 5-amino-1-β-D-ribofuranosylimidazole-4-carboxamide oxime or an O-substituted oxime thereof represented by the formula (I)



(I)

wherein R represents a hydrogen atom, a straight or branched chain alkyl group having 1 to 10 carbon atoms, a cycloalkyl group having 5 to 8 carbon atoms, a benzyl group which may be mono-substituted with a halogen atom or an alkyl or alkoxy group having 1 to 4 carbon atoms at the o, m or p-position thereof, or a 1 or 2-naphthyl group, with carbon disulfide in water or an aqueous medium as a solvent at pH of about 3 to about 12, in a closed reaction zone at a temperature of from about 50° to about 200° C.

3,989,683

METHOD OF TREATING KARAYA GUM

Edward A. Staba, Higganum, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed July 19, 1973, Ser. No. 380,626

Int. Cl.² C07H *15/04*

U.S. Cl. 536—114 4 Claims

1. A method of treating karaya gum to increase the stability of aqueous dispersions of the treated karaya gum in wet primer mixes to improve the extrudability and pot life of the primer mixes, said method comprising the steps of: forming a suspension of karaya gum in a solution comprising an anhydrous alcohol solvate selected from the group consisting of methanol, propanol-2, normal propanol, ethanol, and butyl alcohol, and a reagent solute selected from the group consisting of tannic acid, benzoic acid, sorbic acid, gluconic acid, gluconic acid D-lactone, formaldehyde, and acetic anhydride; maintaining said suspension at a reaction temperature equal at least to room temperature for a time period sufficient to enable said solute to form a condensation reaction product with said karaya gum; and removing said reaction product from said suspension.

3,989,684

METHOD OF MAKING R-S $(O)_{1-2}$C NR_1R_2 COMPOUNDS

Harry Tilles, El Cerrito, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 280,388, Aug. 14, 1972, abandoned. This application Apr. 9, 1973, Ser. No. 349,370

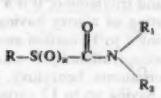
The portion of the term of this patent subsequent to July 22, 1992, has been disclaimed.

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

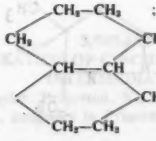
Int. Cl.² C07D *211/16, 223/02, 217/06*

U.S. Cl. 260—239 A 2 Claims

1. A process of manufacturing a pesticidal active compound corresponding to the following formula:

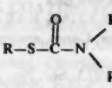


wherein *n* is 1 or 2; R is selected from the group consisting of lower alkyl and lower haloalkyl; R_1 and R_2 taken together form an alkylene group having 2 to 10 carbon atoms, said alkylene group being unsubstituted or substituted with alkyl groups having 1–2 carbon atoms, or R_1 and R_2 taken together form



comprising the steps of:

a. combining an oxidizing agent selected from peracetic acid and m-chloroperoxybenzoic acid and a thiocarbamate compound in a solvent system; said thiocarbamate having the following formula:



b. maintaining the temperature between −25°C. and 60°C.;

c. said oxidizing agent being present in an amount of at least one stoichiometric equivalent and not more than two stoichiometric equivalents.

3,989,685

PROCESS FOR MAKING A 2'-HALOPENICILLIN

Hiroshi Tanida, Osaka, and Teruji Tsuji, Takatsuki, both of Japan, assignors to Shinogi & Co., Ltd., Japan

Filed June 21, 1973, Ser. No. 372,016

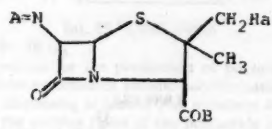
Claims priority, application Japan, June 29, 1972, 47-65355; Nov. 14, 1972, 47-114105

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

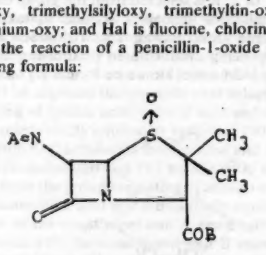
Int. Cl.² C07D *499/04*

U.S. Cl. 260—239.1 **7 Claims**

1. A process for the preparation of a 2'-halopenicillin compound of the following formula:



wherein A=N is a substituted amino selected from the group consisting of phenoxyacetamido, phenylacetamido, thienylacetamido, phenylglycylamino, phenylglycylamino substituted by alkanoyl or alkoxycarbonyl having up to 12 carbon atoms on its amino group, 2-ketopinoylamino, norbornanecarbonylamino, benzamido, 3-phenyl-5-methylisoxazole-4-carbonamido, alkoxycarbonamido having up to 12 carbon atoms, haloalkoxycarbonamido having up to 12 carbon atoms, o-nitrophenylsulfenylamino, benzylideneamino, hydroxybenzylideneamino, phthalimido, 2,2-dimethyl-4-phenyl-5-oxoimidazolidin-1-yl, 2,2-dimethyl-3-nitroso-4-phenyl-5-oxoimidazolidin-1-yl, and tritylamino; B is a member selected from the group consisting of alkoxy having 1 to 12 carbon atoms, haloalkoxy having 1 to 12 carbon atoms, phenacyloxy, halophenacyloxy, methoxymethoxy, alkanoyloxymethoxy having up to 12 carbon atoms, benzyloxy, benzyloxy substituted by nitro, alkoxy having up to 12 carbon atoms or halo, benzhydryloxy, benzalamino-oxy, hydroxy, sodio-oxy, potassio-oxy, trimethylsilyloxy, trimethyltin-oxy, and triethylammonium-oxy; and Hal is fluorine, chlorine, bromine or iodine, by the reaction of a penicillin-1-oxide compound of the following formula:



wherein A and B are as defined above, with an acid halide selected from the group consisting of alkanoyl halides having 1 to 12 carbon atoms, chloroacetyl chloride, oxalyl halide, crotonyl halide, ethynylacetyl halide, phenylacetyl halide, thiopheneacetyl halide, benzoyl halide, benzoyl halide substituted by nitro, methoxy, alkyl having 1 to 12 carbon atoms or halogen, naphthoyl halide, thienoyl halide, nicotinoyl halide, quinolinecarbonyl halide, alkanesulfonyl halide having up to 12 carbon atoms, benzenesulfonyl halide, benzenesulfonyl halide substituted by alkyl having 1 to 12 carbon atoms, methoxy, nitro or halo, naphthalenesulfonyl halide, quinoline-8-sulfonyl halide, 1,3,4-thiadiazolylsulfonyl halide, alkyl haloformate having up to 12 carbon atoms, and phenyl haloformate,

in the presence of a base selected from the group consisting of dialkylamine or trialkylamine having up to 12 carbon atoms, N-methylpiperidine, N-methylmorpholine, N-ethylpyrrolidine, N,N-dimethylbenzylamine, pyridine, picoline, lutidine, quinoline, isoquinoline, N,N-dimethylaniline, urea, thiourea, guanidine, and N-lower alkylurea having up to 12 carbon atoms,

at a temperature of from 70°C to 130°C.

3,989,686

ANAESTHETIC STEROIDS OF THE ANDROSTANE SERIES AND PROCESS FOR PREPARING SAME

Gordon Hanley Phillipps, Wembley, and David Robert Marshall, Chalfont St. Peter, both of England, assignors to Glaxo Laboratories Limited, Greenford, England

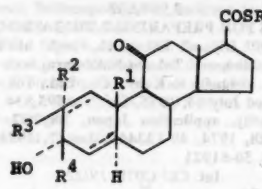
Continuation of Ser. No. 369,141, June 12, 1973, abandoned. This application Sept. 13, 1974, Ser. No. 505,763

Claims priority, application United Kingdom, June 15, 1973, 28117/73

Int. Cl.² C07J *21/00*

U.S. Cl. 260—239.55 R **7 Claims**

1. A steriod of the formula:



where R^1 is hydrogen or methyl; R^2 is hydrogen or methyl; R^3 is hydrogen or when R^3 is hydrogen. C_{1-6} alkoxy, C_{1-6} alkyl, thiocyanato or halogen, R^4 is hydrogen or methyl; R^5 is C_{1-6} alkyl or C^{1-6} alkyl substituted by halogen or substituted by a group—NR^6R^7 where R^6 and R^7 are the same or different C_{1-6} alkyl groups or R^6 and R^7 taken together with the nitrogen atom to which they are attached form a group selected from the group consisting of morpholino, morpholino substituted with C_{1-6} alkyl, and thiamorpholino and the dotted lines represent a double bond at either one of these positions, providing that R^2 and R^3 together represent hydrogen when there is a double bond at the 1,2-position.

3,989,687

4-OXO-1-PYRIDINYL PENICILLIN DERIVATIVES

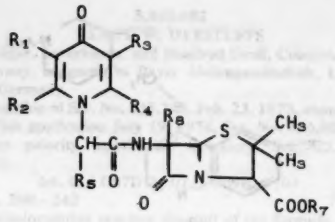
Ronald E. Bambury; Michael L. Edwards, both of Cincinnati, and Laird F. Miller, Loveland, all of Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

Division of Ser. No. 508,999, Sept. 27, 1974, which is a continuation-in-part of Ser. No. 413,565, Nov. 7, 1973, abandoned. This application Oct. 9, 1975, Ser. No. 621,208

Int. Cl.² C07D *499/58*

U.S. Cl. 260—239.1 **6 Claims**

1. A 6-[(4-oxo-1-pyridinyl)acetylamino]penicillin derivative having the formula:



wherein

R_1, R_2, R_3 and R_4 are each selected from the group consisting of hydrogen, halogen, loweralkyl having from 1 to 4 carbon atoms, trifluoromethyl, carboxy, carbomethoxy, carbethoxy and when R_1 is taken in combination with R_2 forms the cyclic radical $—CH_2CH_2CH_2CH_2—$ and ~=CH—CH=CH—;

R_5 is selected from the group consisting of hydrogen, methyl, carboxy, carbomethoxy and carbethoxy;

R_7 is selected from the group consisting of hydrogen, alkanoyloxymethyl, alkanoylaminomethyl, alkoxycarbonylaminomethyl and ρ-(alkanoyloxy)benzyl in which the alkanoyl or alkoxy group contains from 1 to 5 carbon atoms;

R_8 is hydrogen or methoxy; and

the pharmaceutically acceptable salts thereof.

3,989,688

PROCESS FOR PRODUCING 6-AMINO PENICILLANIC ACID DERIVATIVES

Alfred J. Mazzacca, Rutherford, N.J., assignor to Biocraft Laboratories, Inc., Elmwood Park, N.J.

Filed Oct. 21, 1974, Ser. No. 516,740

Int. Cl.² C07D *499/68*

U.S. Cl. 260—239.1 **4 Claims**

1. A process for the production of an α-aminobenzylpenicillin comprising

forming a solution of 6-aminopenicillanic acid or its water-soluble salt,

removing solid contaminants from the 6-aminopenicillanic acid solution,

separately forming a mixed anhydride acylating agent in solution,

cooling said acylating agent solution to maintain a temperature of about −50° C or below,

removing solid contaminants from the cooled acylating agent solution,

combining said 6-aminopenicillanic acid solution and said acylating agent solution in a reaction mixture to produce the desired α-aminobenzylpenicillin, and

recovering the α-aminobenzylpenicillin.

3,989,689

4-CARBAMOYL-1-BENZAZEPINES

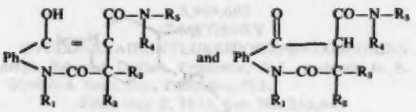
Herman Robert Rodriguez, New York, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 458,917, April 8, 1974, Pat. No. 3,949,081. This application Mar. 25, 1975, Ser. No. 561,821

Int. Cl.² C07D *223/16*

U.S. Cl. 260—239.3 B **10 Claims**

1. A compound of the tautomeric formulae



wherein R_1 is hydrogen, lower alkyl or H-Ph-lower alkyl, each of R_2, R_3 and R_4 is hydrogen or lower alkyl, R_5 is H-Ph, pyrryl, furyl, thienyl, oxazolyl, isoxazolyl, thiazolyl, thiadiazolyl, triazolyl, pyridyl, pyrimydyl, benzthiazolyl or said heterocycles substituted by one or two lower alkyl groups or halogen atoms, or one nitro group and Ph is unsubstituted 1,2-phenylene, or 1,2-phenylene substituted by one or two of the same or different members selected from lower alkyl, lower alkanoyl, lower alkoxy, halogeno or trifluoromethyl; or a therapeutically useful alkali metal or acid addition salt thereof.

3,989,690

THIAZOLE DERIVATIVES

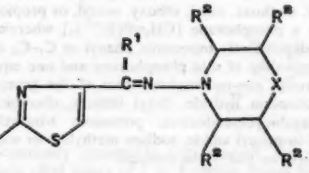
John Pomfret Verge, Henley-on-Thames, and Martin Charles Neville, Tadley, both of England, assignors to Lilly Industries, Ltd., London, England

Continuation-in-part of Ser. No. 398,726, Sept. 19, 1973, abandoned, which is a continuation-in-part of Ser. No. 259,186, June 2, 1972, abandoned. This application Jan. 22, 1975, Ser. No. 542,989

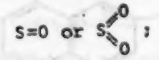
Int. Cl.² C07D *417/14*

U.S. Cl. 260—240 A **6 Claims**

1. Compound of the formula:



wherein X represents S,



R^1 represents hydrogen or C_{1-4} alkyl; each R^2 independently represents hydrogen or C_{1-4} alkyl; and R represents a 1-(R^3-substituted)-5-nitroimidazol-2-yl group in which R^3 represents C_{1-4} alkyl or C_{2-4} alk-1-enyl.

3,989,691

PREPARATION OF CINCHONA ALKALOID INTERMEDIATES

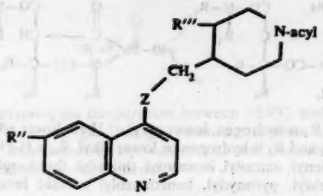
Edward C. Taylor, Princeton, N.J., and Stephen F. Martin, Austin, Tex., assignors to Princeton University, Princeton, N.J.

Continuation-in-part of Ser. No. 321,428, Jan. 5, 1973, abandoned. This application Jan. 9, 1975, Ser. No. 539,669

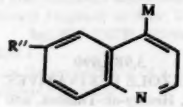
Int. Cl.² C07D *401/06*

U.S. Cl. 260—240 R **8 Claims**

1. A process for preparing a compound of the formula

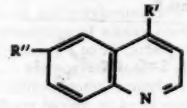


wherein R'' is H or methoxy, R''' is H or vinyl and Z is vinyl which comprises the steps of reacting a quinoline of the formula:

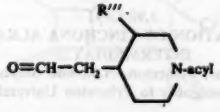


wherein R'' is H or methoxy and M is a group labile to nucleophilic displacement of the class consisting of halo, C_1–C_4 alkylsulfonyl, C_1–C_4 alkyl sulfonyloxy, C_1–C_4 alkylmercapto, aryl sulfonyl, aryl mercapto and aryl sulfonyloxy wherein aryl is phenyl, α or β naphthyl, or substituted phenyl wherein said substituents are members of the group trifluoromethyl, halo, methyl, methoxy, ethyl, ethoxy, acetyl, or propionyl;

with a phosphorane $[CH_2{=}P(R'''')_3]$ wherein each R'''' independently represents phenyl or C_1–C_4 alkyl, or one equivalent of said phosphorane and one equivalent of a strong, non-nucleophilic base of the group sodium or potassium hydride, butyl lithium, diazabicyclononane, diazabicycloundecane, potassium t-butoxide, lithium di-isopropyl amide, sodium methylate or sodium amide; to form an ylid of the formula

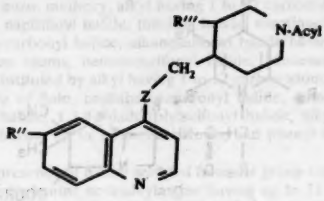


wherein R'' is H or methoxy and R' is $CH{=}P(R'''')_3$ wherein each R'''' independently represents phenyl and C_1–C_4 alkyl and then reacting said ylid with an N-acyl-4-piperidylacetaldehyde of the formula:

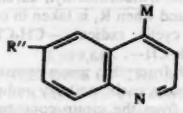


wherein R''' is H or vinyl and then isolating the product of said ylid reaction.

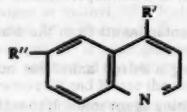
3. A process for preparing a compound of the formula



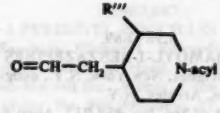
wherein R'' is H or methoxy, R''' is H or vinyl and Z is 1,2-epoxy which comprises the steps of reacting a quinoline of the formula



wherein R'' is H or methoxy and M is a group labile to nucleophilic displacement of the class consisting of halo, C_1–C_4 alkylsulfonyl, C_1–C_4 alkyl sulfonyloxy, C_1–C_4 alkylmercapto, aryl sulfonyl, aryl mercapto and aryl sulfonyloxy wherein aryl is phenyl, α or β-naphthyl or substituted phenyl wherein said substituents are members of the group trifluoromethyl, halo, methyl, methoxy, ethyl, ethoxy, acetyl, or propionyl with a sulfurane $[CH_2{=}S(R'''')_2]$ wherein each R'''' independently represents phenyl or C_1–C_4 alkyl, or with one equivalent of said sulfurane and one equivalent of a strong, non-nucleophilic base of the group sodium or potassium hydride, butyl lithium, diazabicyclononane, diazabicycloundecane, potassium t-butoxide, lithium di-isopropyl amide, sodium methylate or sodium amide to form an ylid of the formula



wherein R'' is H or methoxy and R' is $CH{=}S(R'''')_2$ wherein R'''' represents independently phenyl and C_1–C_4 alkyl and then reacting said ylid with an N-acyl-4-piperidylacetaldehyde of the formula



wherein R''' is H or vinyl and then isolating the product of said ylid reaction.

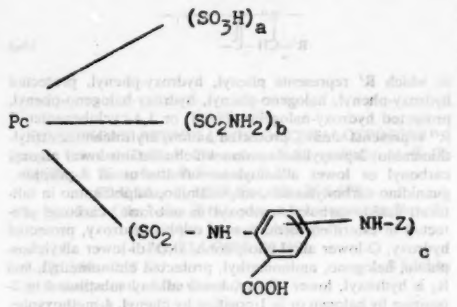
3,989,692

REACTIVE DYESTUFFS

Horst Jager, Leverkusen, and Manfred Groll, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 335,248, Feb. 23, 1973, abandoned. This application July 19, 1974, Ser. No. 490,008
Claims priority, application Germany, Feb. 23, 1972, 2208475
Int. Cl.² C07D *203/12*; C09B *47/04*
U.S. Cl. 260—242 7 Claims

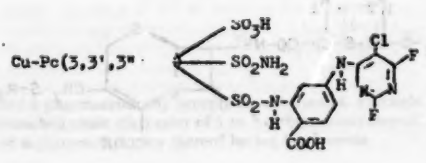
1. Phthalocyanine reactive dyestuff of the formula



wherein

Pc is selected from the group consisting of phthalocyanine, copper phthalocyanine, cobalt phthalocyanine and nickel phthalocyanine where a and c each is a number from 1 to 3 and b is a number from 0 to 2 provided that sum of *a*, *b* and *c* is not greater than 4; and Z represents a fiber-reactive group selected from the group consisting of dihalogenpyrimidinyl, trihalogenpyrimidinyl, 2-methylsulfonyl-5-chloro-6-methylpyrimidinyl and 2,3-dichloroquinoxaline-6-carbonyl.

7. Dyestuff of claim 1 of the formula



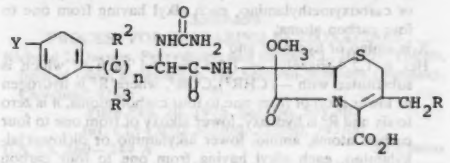
3,989,693

7-METHOXY CYCLONEXADIENYLUREIDOCEPHALOSPORINS

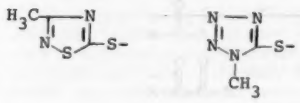
Joseph Edward Dolfini, Princeton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

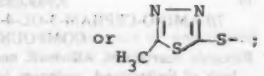
Filed May 2, 1973, Ser. No. 356,641
The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.
Int. Cl.² C07D *501/50*
U.S. Cl. 260—243 C 5 Claims

1. A compound of the formula:

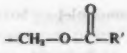


wherein the 7-methoxy group is in the α-configuration; Y is hydrogen, alkyl of 1 to 4 carbon atoms, or alkoxy of 1 to 4 carbon atoms; R^2 and R^3 are independently selected from the group consisting of hydrogen and alkyl of 1 to 4 carbon atoms; n is 0, 1, 2 or 3; and R is





and pharmaceutically acceptable salts thereof, straight or branched chain alkyl esters of 1 to 3 carbon atoms thereof, and acyloxymethyl esters thereof having the formula



wherein R' is lower alkyl of 1 to 5 carbon atoms, phenyl, benzyl or phenethyl.

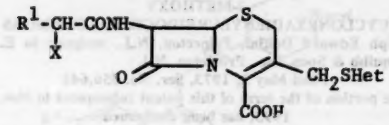
3,989,694

7-ACYL-3-(SUBSTITUTED TRIAZOLYL THIOMETHYL)CEPHALOSPORINS

David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Dec. 27, 1974, Ser. No. 536,759
Int. Cl.² C07D *501/54*; A61K *31/545*
U.S. Cl. 260—243 C 15 Claims

1. A compound of the formula:



in which:

R^1 is thienyl, phenyl or phenyl substituted with one or two groups selected from hydroxy, halo, nitro, hydroxymethyl, amino, lower alkylamino, di(lower)alkylamino, or carboxymethylamino, each alkyl having from one to four carbon atoms;

X is amino or hydroxy; and

Het is 1,2,4-triazolyl or 1,2,3-triazolyl each of which is substituted with $-(CHR^2)_nCOR^3$, where R^2 is hydrogen or lower alkyl of from one to four carbon atoms, *n* is zero to six and R^3 is hydroxy, lower alkoxy of from one to four carbon atoms, amino, lower alkylamino or di(lower)alkylamino, each alkyl having from one to four carbon atoms,

or a non-toxic pharmaceutically acceptable salt thereof.

3,989,695

7β-AMINO-CEPHAM-3-OL-4-CARBOXYLIC ACID COMPOUNDS

Riccardo Scartazzini, Allschwil, and Hans Bickel, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

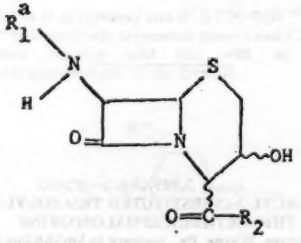
Filed June 26, 1973, Ser. No. 373,817

Claims priority, application Switzerland, June 29, 1972, 9789/72

Int. Cl.² C07D *501/18, 501/16, 501/20*

U.S. Cl. 260—243 C **7 Claims**

1. A 7β-amino-cepham-3-ol-4-carboxylic acid compound of the formula



(I)

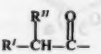
wherein R_1^a represents hydrogen, a group of the formula

(A₁)

in which R′ represents cycloalkyl having 5–7 ring carbon atoms and being substituted in the 1-position by amino, protected amino, sulphoamino or sulphoamino in salt-form, phenyl, or phenyl substituted by hydroxy, protected hydroxyl, lower alkoxy, or halogen, or R_1^a represents a group of the formula

(A₂)

in which R′ represents phenyl, hydroxy-phenyl, protected hydroxyphenyl, halogeno-phenyl, hydroxy-halogeno-phenyl, protected hydroxy-halogeno-phenyl, amino-lower alkyl-phenyl, protected amino-lower alkyl-phenyl, phenyloxyphenyl, phenyloxy, hydroxy-phenyloxy, protected hydroxy-phenyloxy, halogeno-phenyloxy, or phenylthio, or R_1^a represents a group of the formula



(A₃)

in which R′ represents phenyl, hydroxy-phenyl, protected hydroxy-phenyl, halogeno-phenyl, hydroxy-halogeno-phenyl, protected hydroxy-halogeno-phenyl, or 1,4-cyclohexadienyl, R″ represents amino, protected amino, arylthioamino, tritylthioamino, 2-propylideneamino which contains lower alkoxycarbonyl or lower alkanoyl as substituent in 1-position, guanidino-carbonylamino, sulphoamino, sulphoamino in salt-form, azido, carboxyl, carboxyl in salt-form, carboxyl protected in esterified form, cyano, sulpho, hydroxy, protected hydroxy, O-lower alkyl-phosphono, O,O′-di-lower alkylphosphone, halogeno, aminomethyl, protected aminomethyl, and R_2 is hydroxyl, lower alkoxy, lower alkoxy substituted in 2-position by halogen or in 1-position by phenyl, 4-methoxyphenyl, 4-nitrophenyl or lower alkanoyloxy, tri-lower alkylsilyloxy, amino, lower alkylamino, di-lower alkylamino, lower alkyleneamino, oxa-lower alkyleneamino, hydroxylamino, hydrazino, 2-lower alkylhydrazino or 2,2-di-lower alkylhydrazino, and 3-O-esters thereof with a hydrogen halide acid, a lower alkanesulphonic acid, phenylsulphonic acid, 4-methylphenylsulfonic acid, a lower alkanecarboxylic acid, or benzoic acid, and salts of such compounds.

3,989,696

3-HETEROTHIO[(OXYALKYL)THIOACETYL]CEPHALOSPORIN DERIVATIVES

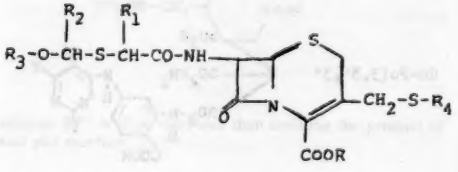
Hermann Breuer, and Uwe D. Treuner, both of Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 1, 1975, Ser. No. 573,677

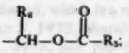
Int. Cl.² C07D *501/50, 501/54*

U.S. Cl. 260—243 C **16 Claims**

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl, tri(lower alkyl)silyl, alkali metal, alkaline earth metal, (lower alkyl)amine or



R_1 is hydrogen, lower alkyl, phenyl, thienyl or furyl; R_2 and R_6 each is hydrogen or lower alkyl; R_3 and R_5 each is lower alkyl, phenyl or phenyl-lower alkyl; R_4 is oxadiazol yl, thiadiazol yl, triazol yl, thiatriazol yl, tetrazol yl, 1-oxopyridin yl and their lower alkyl derivatives; said lower alkyl groups having 1 to 8 carbon atoms.

3,989,697

7-METHOXY PHENYLUREIDOCEPHALOSPORINS

Joseph Edward Dolfini, Princeton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

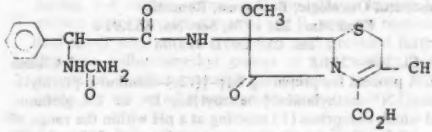
Filed May 2, 1973, Ser. No. 356,678

The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.

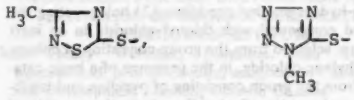
Int. Cl.² C07D *501/54*

U.S. Cl. 260—243 C **8 Claims**

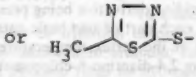
1. A compound of the formula:



wherein the 7-methoxy group is in the α-configuration; R is



or



and a pharmaceutically acceptable salt thereof, a straight or branched chain alkyl ester of 1 to 3 carbon atoms thereof, or an acyloxymethyl ester thereof having the formula

wherein R′ is lower alkyl of 1 to 5 carbon atoms, phenyl, benzyl or phenethyl.

3,989,698

PROCESS FOR PREPARING BENZOXAZINES

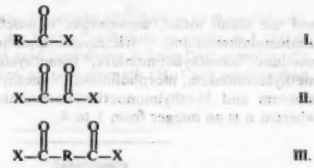
Richard L. Jacobs, Perrysburg, and Richard L. Hively, Toledo, both of Ohio, assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed Feb. 20, 1975, Ser. No. 551,803

Int. Cl.² C07D *265/00, 273/00, 295/00*

U.S. Cl. 260—244 A **50 Claims**

1. A process for preparing benzoxazines which comprises reacting at temperatures of at least about 25° C in the presence of a catalytic amount of at least one tertiary amine, approximately stoichiometric amounts of an isatoic anhydride with an acylating compound selected from the class consisting of (a) carboxylic acid anhydrides and (b) acyl halides having the formulae



wherein X is halogen and R is a saturated or unsaturated organic radical having up to 30 carbon atoms.

3,989,699

MORPHOLINE DERIVATIVES

Roy Frederick Maisey, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

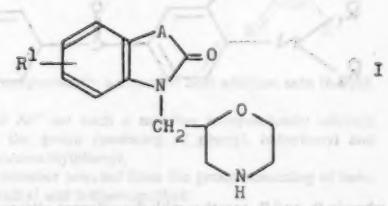
Filed Nov. 29, 1974, Ser. No. 528,578

Claims priority, application United Kingdom, Dec. 13, 1973, 57743/73

Int. Cl.² C07D *265/00, 273/00, 295/00*

U.S. Cl. 260—246 R **4 Claims**

1. A morpholine derivative of the formula:-



wherein R^1 is hydrogen or halogen, or alkyl or alkoxy of 1 to 3 carbons; A is a radical of the formula:-

wherein R^2 and R^3, which may be the same or different, are hydrogen or alkyl of 1 to 3 carbons and B is oxygen; and the non-toxic, pharmaceutically-acceptable acid-addition salts thereof.

3,989,700

SULFOSUCCINATE DERIVATIVES AS DETERGENT BUILDERS

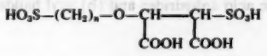
Vincent Lamberti, Upper Saddle River, N.J., assignor to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 484,920, July 1, 1974, Pat. No. 3,957,775, which is a division of Ser. No. 394,613, Sept. 5, 1973, Pat. No. 3,925,375, which is a division of Ser. No. 156,933, June 25, 1971, abandoned. This application June 24, 1975, Ser. No. 589,959

Int. Cl.² C07D *295/00*; C07C *143/00*

U.S. Cl. 260—247.1 E **5 Claims**

1. An α-sulfoalkyl-β-sulfosuccinic acid having the general formula:



and the alkali metal, ammonium, monoethanolammonium, diethanolammonium, triethanolammonium, methylammonium, dimethylammonium, trimethylammonium, tetramethylammonium, morpholinium, N-methylmonoethanolammonium and N-ethylmonoethanolammonium salts thereof, wherein n is an integer from 1 to 4.

3,989,701

DIAMINE-BENZOPHENONES AND A PROCESS FOR THE PREPARATION THEREOF

Edit Toth; József Törley; Éva Pálosi; Szaboles Szeberényi; László Szporny; Sándor Görög, and Csilla Mészáros, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar Rt., Budapest, Hungary

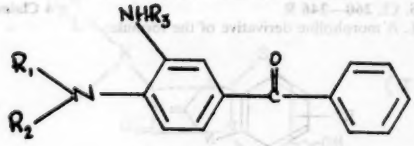
Filed July 3, 1974, Ser. No. 485,744

Claims priority, application Hungary, July 26, 1973, RI 518

Int. Cl.² C07D *295/00*

U.S. Cl. 260—247.2 A **8 Claims**

1. A compound of the formula:



wherein R_1 and R_2 together with the adjacent nitrogen form a 5 or 6 member saturated heterocyclic which is interrupted only by the adjacent nitrogen, by an additional nitrogen or by oxygen; and is unsubstituted or substituted with a lower alkyl and R_3 is hydrogen or C_1 to C_{18} acyclic acyl; or a pharmaceutically acceptable salt thereof.

3,989,702

FLAME RETARDANT

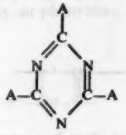
Albert Y. Garner, Yellow Springs, Ohio, assignor to Monsanto Research Corporation, St. Louis,, Mo.

Filed July 22, 1974, Ser. No. 490,607

Int. Cl.² C07D *251/66*; C09K *3/28*

U.S. Cl. 260—249.6 **1 Claim**

1. A mixture comprising compounds of the formula



wherein A is NH_2 or $N{=}P(NH_2)_3$, provided at least one A is $N{=}P(NH_2)_3$.

3,989,703

PROCESS OF PREPARING N[P-{[(2,4-DIAMINO-6-PTERIDYL)-METHYL]N^{10}-METHYLAMINO}-BENZOYL]-GLUTAMIC ACID

Ion Niculescu-Duvăz; Liviu Valentin Feyns; Dan Suster, and Gheorghe Clustea, all of Bucharest, Romania, assignors to Institutul Oncologic, Bucharest, Romania

Filed Mar. 22, 1974, Ser. No. 453,914

Int. Cl.² C07D *475/08*

U.S. Cl. 260—251.5 **2 Claims**

1. A process for preparing N[p-{[(2,4-diamino-6-pteridyl)-methyl]-N^{10}-methylamino}-benzoyl]L-, D- or DL-glutamic acid which comprises (1) reacting at a pH within the range of 3 and 7.5 and at a temperature range between 20° and 100° C, 2,4,5,6-tetraaminopyrimidine dihydrochloride with the bisulphite addition product of 1,3-dihydroxyacetone, the molar ratio between said dihydrochloride compound and said bisulphite addition product being in the range between 0.2:1 and 1:1, in aqueous medium using air bubbling and selenium dioxide as oxidation agents and cysteine as catalyst to form 2,4-diamino-6-hydroxymethyl pteridine; (2) halogenating the last mentioned compound with thionyl chloride in an inert organic medium selected from the group consisting of chloroform and methylene chloride, in the presence of a basic catalyst selected from the group consisting of pyridine and triethylamine, the molar ratio of pteridine derivative to thionyl chloride being in the range between 0.2:1 and 1.2:1, and the pteridine derivative being present in 1.0–10.0 parts by weight for each part of said basic catalyst, the reaction being carried out at the reflux temperature of the inert medium used, to form 2,4-diamino-6-chloromethyl-pteridine; and (3) condensing the latter with N[p-(N-methylamino) benzoyl]-L,D-or DL-glutamic acid in a buffered aqueous medium, at a pH in the range of 3.0 to 6.0 and at a temperature between 20° and 100° C.

3,989,704

3-SUBSTITUTED-4-ARYL ISOQUINOLINES

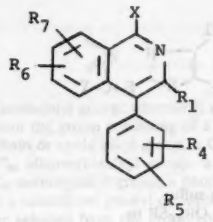
William J. Houlihan, Mountain Lakes, and Jeffrey Nadelson, Lake Parsippany, both of N.J., assignors to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 411,074, Oct. 30, 1973, Pat. No. 3,872,125, which is a continuation-in-part of Ser. No. 339,616, March 3, 1973, abandoned, which is a continuation-in-part of Ser. No. 259,860, June 5, 1972, abandoned. This application Jan. 21, 1975, Ser. No. 542,843

Int. Cl.² C07D *217/22*

U.S. Cl. 260—283 R 2 Claims

1. A compound of the formula



where

R_1 represents

where

R_2 and R_3 are each, independently, methyl or ethyl, or R_2 and R_3 together represent $(CH_2)_n$

where

n represents 4, 5 or 6,

where

R_4, R_5, R_6, R_7 each, independently, represent hydrogen, halo of atomic weight 19–36, trifluoromethyl, lower alkyl having 1–4 carbon atoms, or lower alkoxy having 1–4 carbon atoms, provided that R_6 and R_7 may not represent said lower alkyl at the 8-position, and provided further that two trifluoromethyl groups or two tertiary butyl groups or a trifluoromethyl group and a tertiary butyl group are not on adjacent carbon atoms.

and

X represents halo of atomic weight about 35–80.

3,989,705

PROCESSES FOR THE DEUTERATION AND/OR TRITIATION OF ORGANIC SUBSTRATES BY HYDROGEN SUBSTITUTION

Nick Henry Werstiuk, Hamilton, and Tonu Kadai, Beaconsfield, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Apr. 1, 1974, Ser. No. 456,935

Int. Cl.² C07D *213/04*

U.S. Cl. 260—290 P 10 Claims

1. A process for the deuteration or tritiation of organic substrates containing at least one unsaturated aromatic ring selected from benzene rings and pyridine rings by hydrogen substitution and being capable of carbonium ion formation, wherein the substrate is subjected to the effects of a 0.10 to 10% v/v dilute solution of a strong acid in deuterium or tritium oxide respectively at a temperature between 200° and 400° C.

3,989,706

PROCESS FOR THE PREPARATION OF PYRIDINES

Yataro Ichikawa; Yuitsu Honda; Kazuhiko Soma; Nobuo Suzuki, all of Iwakuni, and Teizo Yamaji, Shuto all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Jan. 2, 1974, Ser. No. 429,776

Claims priority, application Japan, Dec. 3, 1973, 48-135624

Int. Cl.² C07D *213/08, 213/12*

U.S. Cl. 260—290 P 8 Claims

1. A process for the preparation of pyridines which comprises contacting, at a temperature of 200° C. to 600° C., in the vapor phase,

1. a saturated or unsaturated aliphatic or alicyclic hydrocarbon having at least 2 carbon atoms and no more than 20 carbon atoms,
2. 0.1 to 100 mols of ammonia per mol of said hydrocarbon, and
3. 0.1 to 100 mols of molecular oxygen per mol of said hydrocarbon,
4. in the presence of a catalyst composed of a solid acid containing, in the form of the metal or metal oxide:
   i. tellurium,
   ii. at least one metal selected from the group consisting of antimony, iron, cobalt, nickel, manganese, tungsten, rhenium, titanium, aluminum, germanium, tin, lead, arsenic and zirconium, and
   iii. at least one metal selected from the group consisting of nickel, titanium, germanium, arsenic, indium, platinum, osmium, semarium, niobium, phosphorus and bismuth,
5. wherein the ratio by weight of tellurium to the solid acid, calculated on the basis of tellurium to oxide, is 1:100 to 10:1, said solid acid containing at least 0.01 mmol/g of a solid acid having an acid strength (Ho) not weaker than 4.8.

3,989,707

BENZIMIDAZOLINONE DERIVATIVES

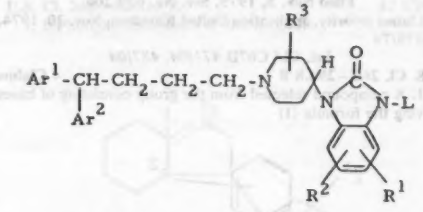
Paul Adriaan Jan Janssen; Albert H. M. Th. Van Heertum, both of Vosselaar; Jan Vandenberk, Beerse, and Marcel J. M. C. Van der Aa, Vosselaar, Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Filed June 21, 1974, Ser. No. 481,594

Int. Cl.² C07D *401/04*

U.S. Cl. 260—293.6 6 Claims

1. A compound selected from the group consisting of a benzimidazolinone derivative having the formula:



and the therapeutically acceptable acid addition salts thereof, wherein:

Ar^1 and Ar^2 are each a member independently selected from the group consisting of phenyl, halophenyl and trifluoromethylphenyl;

R^1 is a member selected from the group consisting of halo, loweralkyl and trifluoromethyl;

R^2 is a member selected from the group consisting of hydrogen, halo, loweralkyl and trifluoromethyl;

R^3 is a member selected from the group consisting of hydrogen and methyl, provided that, when said R^3 is methyl,

then said R^3 is in the 2- or 3-position of the piperidine-nucleus; and

L is a member selected from the group consisting of hydrogen, loweralkyl, loweralkyloxycarbonyl-loweralkyl, loweralkylcarbonyl-loweralkyl and phenyl-loweralkyl.

3,989,708

2-AMINO-1,4-DIHYDROPYRIDINE DERIVATIVES

Horst Meyer; Friedrich Bossert, both of Wuppertal; Wulf Vater, Opladen, and Kurt Stoepel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 390,194, Aug. 21, 1973, Pat. No. 3,862,162. This application Nov. 25, 1974, Ser. No. 526,510

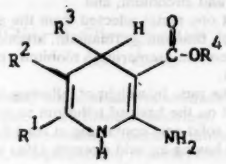
Claims priority, application Germany, Aug. 31, 1972, 2242786

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 20, 1976

Int. Cl.² C07D *213/55*

U.S. Cl. 260—294.8 D **2 Claims**

1. A compound of the formula:



wherein R^1 is lower alkyl or phenyl;

R^3 is pyridyl, naphthyl; thienyl or furyl;

R^2 is hydrogen or lower alkyl; and

R^4 is lower alkyl, alkenyl of 2 to 4 carbon atoms, or lower alkyl.

3,989,709

FUSED RING BENZIMIDAZOLE DERIVATIVES

Alan Chapman White, Windsor, and Robin Michael Black, Porton, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

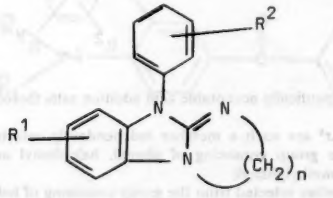
Filed Nov. 5, 1975, Ser. No. 629,206

Claims priority, application United Kingdom, Nov. 20, 1974, 50178/74

Int. Cl.² C07D *471/04, 487/04*

U.S. Cl. 260—294.8 B **4 Claims**

1. A compound selected from the group consisting of bases having the formula (I)



(I)

and the pharmaceutically acceptable acid addition salts thereof, wherein R^1 and R^2 each represent hydrogen, hydroxyl, lower alkyl, lower alkoxy, trifluoromethyl or halogen and *n* represents 2 or 3.

3,989,710

CERTAIN 2-MERCAPTO-4,5-DICHLORO-THIAZOLE COMPOUNDS

Klaus Sasse, Schildgen; Gunther Beck, Leverkusen, and Ludwig Eue, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

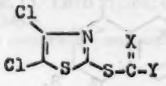
Filed Aug. 14, 1974, Ser. No. 497,356

Claims priority, application Germany, Sept. 1, 1973, 2344134

Int. Cl.² C07D *277/36*

U.S. Cl. 260—302 H **17 Claims**

1. 2-Mercapto-4,5-dichloro-thiazole compound of the formula



(I)

in which

X is oxygen or sulfur

Y is a radical -OR, -SR or

R is alkyl of from 1 to 12 carbon atoms optionally substituted by one or more substituents selected from chlorine, bromine, lower alkoxy, phenoxy, lower alkylmercapto and phenylmercapto; or

R is alkenyl of from 2 to 6 carbon atoms or alkynyl of from 3 to 6 carbon atoms; or

R is aralkyl of from 1 or 2 phenyl radicals on the alkyl moiety and 1 to 4 carbon atoms in the alkyl moiety, the phenyl moiety optionally substituted by one or more substituents selected from chlorine, methyl, trifluoromethyl, nitro, methoxy, methylmercapto and cyano; or

R is cycloalkyl of from 4 to 7 carbon atoms wherein the ring may be substituted by methyl or a fused benzene ring; or

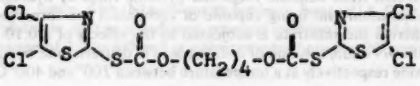
R is aryl of up to 10 carbon atoms optionally substituted by one or more radicals selected from chlorine, lower alkyl, trifluoromethyl, nitro, methoxy, methylmercapto, dimethylamino, carbethoxy, N,N-dimethyl-carbamoyl and cyano; and

R^1 and R^2 are alkyl of from 1 to 12 carbon atoms, optionally substituted by a substituent selected from methoxy, methylmercapto, phenoxy and cyano; alkyl, cyclohexyl, or phenyl, the phenyl ring being optionally substituted by a substituent selected from chlorine, methyl, methoxy methylmercapto and nitro; or

R^1 and R^2 together with the adjoining nitrogen represent a member selected from the group consisting of pyrrolidin-1-yl, piperidin-1-yl, hexamethylenimin-1-yl, tetrahydroquinolin-1-yl, imidazol-1-yl, 1,2,4-triazol-1-yl, morpholin-4-yl and thiamorpholin-4-yl; and

X and Y together represent a triply bonded nitrogen atom.

17. Bis-thiocarbonic acid 0,0-1,4-butylene ester S,S-bis-4,5-dichloro-thiazolyl-(2) ester of the formula

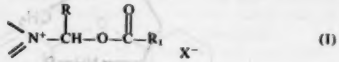


3,989,711
SOFT QUATERNARY SURFACE ACTIVE AGENTS EXHIBITING ANTIBACTERIAL ACTIVITY

Nicolae S. Bodor, Lawrence, Kans., assignor to Interx Research Corporation, Lawrence, Kans.

Filed Sept. 22, 1975, Ser. No. 615,519
Int. Cl.² C07D *233/60*
U.S. Cl. 260—309 20 Claims

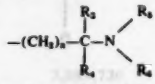
1. A soft quaternary compound of the formula:



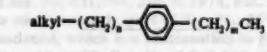
(I)

wherein

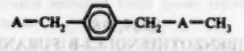
represents an imidazolyl group; wherein R represents a member selected from the group consisting of a hydrogen atom, a C_1–C_{20} open-chain or cyclo alkyl group, a C_1–C_{20} alkoxyalkyl group, a C_1–C_{20} alkanoyloxalkyl group, a C_1–C_{20} haloalkyl group, a C_1–C_{20} carboxyalkyl group, a phenyl group, a naphthyl group and a substituted phenyl or naphthyl group, whose substituents are selected from the group consisting of a halogen atom, an O—C_1–C_4 alkyl group, and O—C_1–C_8 alkanoyl group, a nitro group, a carboxyl group, and a carboethoxy group; wherein R_1 represents a C_9–C_{22} straight or branched alkyl group, a



group, wherein R_3, R_4, R_5 and R_6 are each selected from the group consisting of a hydrogen atom, a methyl group, or an ethyl group, and wherein R_1 further represents a member selected from the group consisting of a C_1–C_{22} straight or branched



group, wherein *n* in each occurrence and *m* represent an integer of from 0 to 22, and an



group, wherein A represents a $-(CH_2CH_2O)_p$ group, wherein the *p* represents an integer of from 0 to 22; and wherein X represents a member selected from the group consisting of a halogen atom, a methanesulfonate group, a fluorosulfonate group and a tosylate group.

3,989,712
THIO-BIS(PHTHALIMIDES)

Frank J. Williams, III, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 30, 1973, Ser. No. 346,470
Int. Cl.² C07D *209/38*
U.S. Cl. 260—326 S 3 Claims

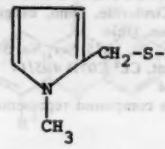
1. 3,3'-bis(N-phenylphthalimide)sulfide.

3,989,713
PYRRYLMETHYLTHIO FLAVORING AGENTS

Max Winter, Petit-Lancy; Fritz Gautschi, Commugny; Ivon Flament; Max Stoll, both of Petit-Lancy, all of Switzerland, and Irving M. Goldman, Niantic, Conn., assignors to Firmenich & Cie, Geneva, Switzerland

Division of Ser. No. 482,820, July 24, 1974, which is a division of Ser. No. 243,866, April 13, 1972, abandoned, which is a division of Ser. No. 70,560, Sept. 8, 1970, Pat. No. 3,702,253, which is a continuation of Ser. No. 543,069, April 18, 1966, abandoned, which is a continuation-in-part of Ser. No. 452,342, April 30, 1965, abandoned. This application May 29, 1975, Ser. No. 581,618
Int. Cl.² C07D *207/32, 405/12*
U.S. Cl. 260—326.2 5 Claims

1. A pyrrole sulfur compound of the formula



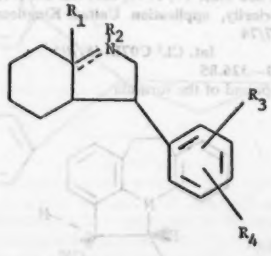
wherein R is methyl, ethyl, acetyl or furfuryl-2.

3,989,714
3-PHENYLHYDROINDOLES

Sylvester Klutchko, Hackettstown, N.J.; Arch Christian Sonntag, Madison, Wis., and John Shavel, Jr., Mendham, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation of Ser. No. 290,931, Sept. 21, 1972, abandoned. This application Oct. 21, 1974, Ser. No. 516,512
Int. Cl.² C07D *209/04*
U.S. Cl. 260—326.11 R 13 Claims

1. 3-Phenylhydroindoles of the formula:



wherein R_1 may be hydrogen, lower alkyl, phenyl, or may be absent; R_2 may be hydrogen, hydroxy, lower alkyl or absent; or where R_1 is absent, R_2 may be $CH_2^+I^-$ or O; and R_3 and R_4 may be hydrogen, hydroxy or lower alkoxy.

3,989,715

PROCESS FOR MANUFACTURING CHLOROTHIANTHRENES

Harry E. Buckholtz, Kenmore; Arun C. Bose, Tonawanda, both of N.Y., and John C. Graham, Warren, Mich., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Aug. 1, 1975, Ser. No. 601,218
Int. Cl.² C07D *339/08*
U.S. Cl. 260—327 P 12 Claims

1. A process for the manufacture of chlorothianthrene which comprises reacting chlorine with thianthrene in monochlorotoluene in the presence of a Lewis acid catalyst.

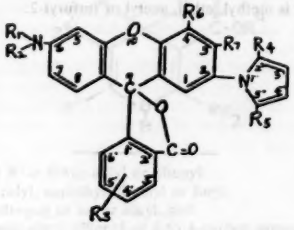
3,989,716

PYRRYLFLUORAN COMPOUNDS

Sydney M. Spatz, Circleville, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed Apr. 29, 1975, Ser. No. 572,750
Int. Cl.² C07D *405/14*
U.S. Cl. 260—326.34 8 Claims

1. A pyrrylfluoran compound represented by the general formula



wherein, R_1 and R_2 may be the same or different and each represents hydrogen or a lower alkyl group containing one to four carbon atoms, R_3 is hydrogen or a methyl group, R_4 and R_5 each represent a methyl or ethyl group, and R_6 and R_7 each represents hydrogen, a methyl or ethyl group or chlorine.

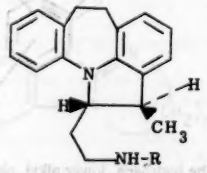
3,989,717

INDOLOBENZAZEPINE DERIVATIVES

Basil Heath-Brown, Welwyn Garden City, England, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 17, 1975, Ser. No. 559,118
Claims priority, application United Kingdom, Mar. 25, 1974, 13207/74
Int. Cl.² C07D *487/05*
U.S. Cl. 260—326.85 5 Claims

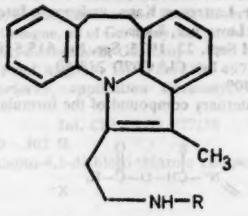
1. A compound of the formula



wherein R is selected from the group consisting of methyl and ethyl,

and the acid addition salts thereof.

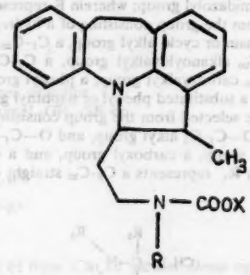
4. A compound of the formula



II

wherein R is selected from the group consisting of methyl and ethyl.

5. A compound of the formula



X

wherein R is selected from the group consisting of methyl and ethyl and X is a lower alkyl group.

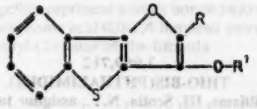
3,989,718

[1]BENZOTHIENO[3,2-B]FURANS

James Richard Beck, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed May 6, 1975, Ser. No. 574,996
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² C07D *333/60*
U.S. Cl. 260—330.5 5 Claims

1. A compound of the formula



wherein R represents cyano, C_1–C_2 alkylcarbonyl or C_1–C_2 alkoxycarbonyl;
R^1 represents C_1–C_2 alkyl or hydrogen;
provided that R^1 represents hydrogen when R respresents cyano or C_1–C_2 alkylcarbonyl.

3,989,719

DIBENZOXAZEPINE N-CARBOXYLIC ACID HYDRAZIDES AND DERIVATIVES

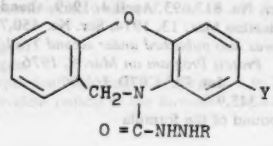
Richard A. Mueller, Glencoe, Ill., assignor to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 127,360, March 23, 1971, abandoned. This application Feb. 5, 1973, Ser. No. 329,406

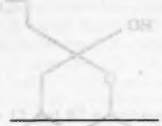
Int. Cl.² C07D 267/20

U.S. Cl. 260—333 4 Claims

1. A compound of the formula



wherein Y is a chloro radical and R is an alkanoyl radical containing 7–12 carbon atoms.



3,989,720

DISUBSTITUTED XANTHONE CARBOXYLIC ACID COMPOUNDS

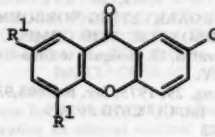
Jurg R. Pfister, Los Altos; Ian T. Harrison, and John H. Fried, both of Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 558,023, March 13, 1975, which is a division of Ser. No. 431,794, Jan. 8, 1974, Pat. No. 3,894,049, which is a continuation-in-part of Ser. No. 259,852, June 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 217,287, Jan. 12, 1972, Pat. No. 3,849,565. This application Dec. 4, 1975, Ser. No. 637,559

Int. Cl.² C07D 311/86

U.S. Cl. 260—335 7 Claims

1. A compound selected from those represented by the following formula:



and the pharmaceutically acceptable, non-toxic alkyl or glycerol esters, amides, and salts thereof;

wherein the R^1 groups are identical and selected from the group

in which n is the integer 2 and R is amino, monolower alkylamino, or dilower alkylamino.

3,989,721

DISUBSTITUTED XANTHONE CARBOXYLIC ACID COMPOUNDS

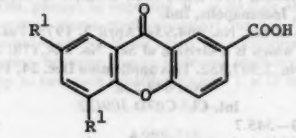
Jurg R. Pfister, Los Altos; Ian T. Harrison, and John H. Fried, both of Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 558,023, March 13, 1975, which is a division of Ser. No. 431,794, Jan. 8, 1974, Pat. No. 3,894,049, which is a continuation-in-part of Ser. No. 259,852, June 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 217,287, Jan. 12, 1972, Pat. No. 3,849,565. This application Dec. 4, 1975, Ser. No. 637,560

Int. Cl.² C07D 311/86

U.S. Cl. 260—335 4 Claims

1. A compound selected from those represented by the following formula:



and the pharmaceutically acceptable, non-toxic alkyl or glycerol esters, amides, and salts thereof;

wherein the R^1 groups are identical and selected from the group

in which *n* is the integer 1 and R is lower alkyl.

3,989,722

1-AMINOMETHYL-2,2-DIARYL-CYCLOPROPANE CARBOXAMIDES

Jean-Claude Cognacq, Garches, France, assignor to Societe Anonyme dite: Hexachimie, Rueil-Malmaison, France

Filed Nov. 19, 1973, Ser. No. 417,129

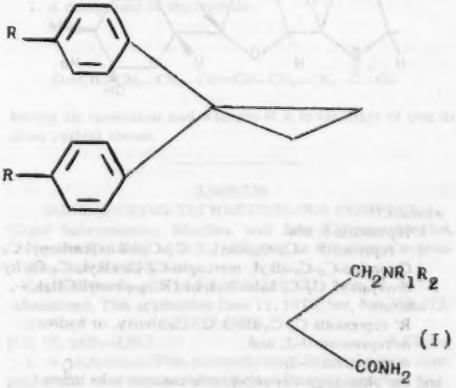
Claims priority, application United Kingdom, Nov. 30, 1972, 55276/72

Int. Cl.² C07C 101/12, 101/14, 101/16; C07D 307/62

U.S. Cl. 260—343.7 9 Claims

1. Compounds selected from the group consisting of:

a. 1-aminomethyl-2,2-diarylcyclopropane carboxamides corresponding to the general formula (I)



(I)

in which R represents the hydrogen atom, a halogen atom or a lower alkyl or lower alkoxy group; R_1 and R_2 which may be the same or different each represent the hydrogen atom, a lower alkyl group, phenyl or benzyl; and

b. their non-toxic acid addition salts and quaternary ammonium salts.

3,989,723

ANTIBIOTIC A204I DERIVATIVES

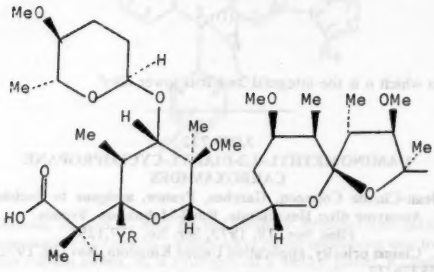
Robert L. Hamill, New Ross, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

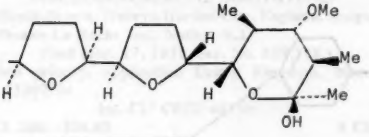
Division of Ser. No. 564,934, April 3, 1975, Pat. No. 3,953,474, which is a division of Ser. No. 524,178, Nov. 15, 1974, Pat. No. 3,907,832. This application Dec. 24, 1975, Ser. No. 644,232

Int. Cl.² C07D *309/22*

U.S. Cl. 260—345.7 3 Claims

1. The A204I derivative of the formula:





wherein:

Y represents S; and

R represents C_1–C_6-alkyl, C_1–C_4-alkoxycarbonyl-C_2-C_8samino-C_2–C_5-alkyl, mercapto-C_2–C_5-alkyl, C_2–C_5 hydroxyalkyl, C_2–C_5 haloalkyl, or $(R')_m$-phenyl$(CH_2)_n$—, wherein

R' represents C_1–C_4-alkyl, C_1–C_4-alkoxy, or hydroxy;

m represents 0–2; and

n represents 0–3;

and the physiologically-acceptable cationic salts thereof.

3,989,724

TETRAHYDROPYRAN-2-OLS

Gabriel Saucy, Essex Fells, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

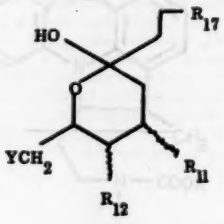
Division of Ser. No. 57,372, July 22, 1970, Pat. No. 3,816,458, which is a continuation-in-part of Ser. No. 679,989, Nov. 2, 1967, Pat. No. 3,544,598, which is a continuation-in-part of Ser. No. 633,730, April 26, 1967, abandoned, which is a continuation-in-part of Ser. No. 604,124, Dec. 23, 1966, abandoned, which is a continuation-in-part of Ser. No. 549,816, May 13, 1966, abandoned, which is a continuation-in-part of Ser. No. 813,693, April 4, 1969, abandoned. This application Mar. 13, 1974, Ser. No. 450,708

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.² C07D *315/00*

U.S. Cl. 260—345.9 8 Claims

1. A compound of the formula



wherein Y is hydrogen; an alkyl group of from 1 to 6 carbons or a group of the formula $R_5CH_2C(R_3,R_4)CH(R_{14})CH(R_{15})$— wherein R_3, when taken alone, is hydroxy or a conventional hydrolyzable ether or ester group convertible to a hydroxy group by hydrolysis, R_4, when taken alone is hydrogen, and R_3 and R_4, when taken together, are oxo or a conventional hydrolyzable ketal group convertible to an oxo moiety by hydrolysis; R_5, R_{11}, R_{12}, R_{14} and R_{15} are each independently hydrogen or lower alkyl; and R_{17} is lower hydrocarbylamino or di(lower hydrocarbyl)amino.

3,989,725

PERFLUOROALKYLTHIO NORBORNANE 2,3-DICARBOXYLIC ACID COMPOUNDS

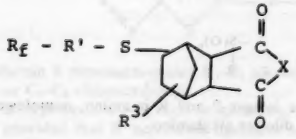
Neal O. Brace, Wheaton, Ill., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 29, 1975, Ser. No. 608,932

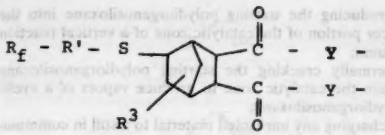
Int. Cl.² C07D *307/89*

U.S. Cl. 260—346.3 9 Claims

1. A compound having the formula

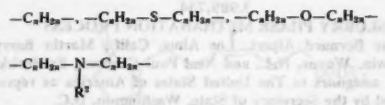


I or



II

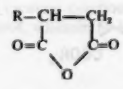
and an isomeric mixture thereof,
wherein
X is oxygen,
Y is oxygen,
R is independently hydrogen or alkyl of 1 to 24 carbons,
R′ is a divalent radical of the formula



where n is 1 to 12 and R^2 is hydrogen or alkyl of 1 to 6 carbon atoms, R_f is straight or branched chain perfluoroalkyl of 1 to 18 carbon atoms or said perfluoroalkyl substituted by perfluoroalkoxy of 2 to 6 carbon atoms, and R^2 is hydrogen or methyl.

3,989,726
PLATINUM CATALYZED ISOMERIZATION OF ALKENYL SUCCINIC ANHYDRIDES
Shigeto Suzuki, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.
Filed Sept. 15, 1975, Ser. No. 613,599
Int. Cl.² C07D 307/60
U.S. Cl. 260—346.8 R **13 Claims**

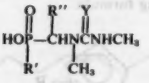
1. A process for preparing alkyl maleic anhydrides which comprises heating an alkenyl succinic anhydride of the formula



wherein R is alkenyl containing 3 to 7 carbon atoms, at a temperature below about 250° C in the presence of a catalytic amount of an alkali metal platinum halide salt in combination with a weakly basic material having a pK_b of from 2 to about 10.

3,989,727
UREA-PHOSPHORUS COMPOUNDS
Gail H. Birum, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.
Continuation-in-part of Ser. No. 385,933, Aug. 6, 1973, Pat. No. 3,904,654. This application June 2, 1975, Ser. No. 582,961
Int. Cl.² C07F 9/30, 9/38
U.S. Cl. 260—347.3 **13 Claims**

1.



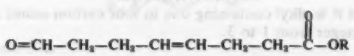
where
R′ is OH, phenyl, or naphthyl, R″ is alkyl or alkenyl of 1 to 15 carbon atoms, methylthioethyl, furanyl or phenyl and substituted phenyl forms where the substituent is fluorine, chlorine, bromine, cyano, hydroxyl, methoxy, or mixtures of up to two such substituents and Y is O or S.

3,989,728
PROCESS FOR SYNTHESIZING SPECIFIC COMPLETE MIXED POLYOL ESTERS
James Bruce Martin, Hamilton, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio
Filed Feb. 12, 1975, Ser. No. 549,400
Int. Cl.² C11C 3/02; A23J 7/00; C09F 5/00
U.S. Cl. 260—410.7 **16 Claims**

1. A process for preparing specific complete mixed polyol esters from partial polyol esters with substantially no ester group rearrangement comprising esterifying a partial polyol ester with an acid anhydride in the presence of an anhydrous catalyst selected from the group consisting of ferric chloride, zinc chloride, stannic chloride and mixtures thereof, said partial polyol ester being selected from the group consisting of partial polyol esters from saturated aliphatic diols having the hydroxyl groups unsymmetrically substituted with respect to the carbon chain and partial polyol esters from saturated aliphatic polyols containing at least three hydroxyl groups.

3,989,729
SYNTHESIS OF 8-OXO-4-CIS-OCTENOIC ACID ESTER
Richard J. Anderson, and Clive A. Henrick, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.
Division of Ser. No. 463,938, April 25, 1974, Pat. No. 3,919,329. This application Apr. 14, 1975, Ser. No. 567,909
Int. Cl.² C11C 3/02; A01N 9/24; A01K 31/22
U.S. Cl. 260—410.9 R **4 Claims**

1. A compound of the formula:



having cis isomerism and wherein R is lower alkyl of one to three carbon atoms.

3,989,730
BONE-SEEKING TECHNETIUM-99M COMPLEX
Gopal Subramanian, Manlius, and John Gilmore McAfee, Fayetteville, both of N.Y., assignors to Research Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 263,171, June 15, 1972, abandoned. This application June 11, 1973, Ser. No. 368,473
Int. Cl.² C07F 7/22
U.S. Cl. 260—429.7 **4 Claims**

1. A technetium-99m-tin-methylene diphosphonate complex useful as a bone-seeking skeletal-imaging agent.

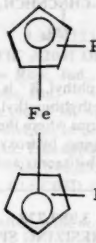
3,989,731

PRODUCTION OF DIMERS OF DICYCLOPENTADIENYL IRON COMPOUNDS

Meldon L. Talbot, Boulder, Colo., assignor to Syntex Corporation, Panama, Panama

Filed Sept. 13, 1968, Ser. No. 761,015
Int. Cl.² C07F 15/02
U.S. Cl. 260—439 CY 6 Claims

1. In the process for the production of dimeric condensation product of a dicyclopentadienyl iron compound involving the reaction of a dicyclopentadienyl iron compound selected from those of the following formula:



in which each of R and R' is hydrogen, alkyl, cycloalkyl, monocyclic aryl, pyrryl, pyridyl, or furfuryl, with a methylene radical generating coupling agent selected from the group consisting of formaldehyde, paraformaldehyde, methylal, s-trioxane, and chloromethyl-methyl ether in the presence of a strong acid catalyst, the improvement wherein said iron compound and said coupling agent are reacted at a temperature of between room temperature and reflux temperature in a two-phase system wherein the first phase comprises said strong acid and a polar organic solvent and the second phase comprises said iron compound, said coupling agent being added slowly to the two-phase system with agitation, said second phase being slightly soluble in said first phase.

3,989,732

PHOTOSENSITIVE COPPER (I) COMPLEXES

Henry J. Gysling, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 365,375, May 30, 1973, Pat. No. 3,860,500. This application Oct. 25, 1974, Ser. No. 518,656
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² C07F 1/08
U.S. Cl. 260—438.1 5 Claims

1. A copper (I) complex having the formula

$$Cu[P(OR)_3]_nBH_3CN$$

wherein R is alkyl containing one to four carbon atoms and *n* is an integer from 1 to 3.

3,989,733

PROCESS FOR THE PREPARATION OF CYCLIC POLYDIORGANOSILOXANES

Haruo Okamoto, and Isao Yanagisawa, both of Annnaka, Japan, assignors to Shinetsu Chemical Company, Tokyo, Japan

Filed Dec. 28, 1973, Ser. No. 429,272
Claims priority, application Japan, Dec. 30, 1972, 48-3123
Int. Cl.² C07F 7/08
U.S. Cl. 260—448.2 E 11 Claims

1. In a process for the thermal cracking of polydiorganosiloxanes in the presence of an alkaline catalyst to produce cyclic polydiorganosiloxanes, the improvement which comprises carrying out the reaction using the following steps:

a. introducing the starting polydiorganosiloxane into the upper portion of the catalytic zone of a vertical reaction column;
b. thermally cracking the starting polydiorganosiloxane within the catalytic zone to produce vapors of a cyclic polydiorganosiloxane;
c. discharging any unreacted material to a still in communication with the bottom of the reaction column;
d. rectifying the vapors in a rectification zone in communication with the top of the catalytic zone; and
e. removing the rectified cyclic polydiorganosiloxane from the top of the rectification zone.

3,989,734

SLURRY PHASE METHANATION PROCESS

Seymour Bernard Alpert, Los Altos, Calif.; Martin Barry Sherwin, Wayne, N.J., and Neal Paul Cochran, Frederick, Md., assignors to The United States of America as represented by the Secretary of State, Washington, D.C.

Continuation of Ser. No. 327,245, Jan. 26, 1973, abandoned. This application Oct. 25, 1974, Ser. No. 518,036
Int. Cl.² C07C 1/04, 1/16
U.S. Cl. 260—449.6 3 Claims

1. A process for converting a gas stream containing from 1 to 25 mole % of carbon monoxide and from 2 to 75 mole % of hydrogen to methane which comprises: passing said gas stream and a fluidizing medium which is a chemically stable liquid selected from the group consisting of desulfurized gas oils and paraffins having a boiling point of from 400° to 1000° F. into a reaction zone containing a bed of nickel catalyst particles; maintaining a flow rate of such gas stream and fluidizing medium upwardly through said reaction zone so as to expand the volume of said bed of nickel catalyst particle by at least 5% at a temperature of from 500° to 800° F., said nickel catalyst particles having a particle size of from 0.006 to 0.375 inches.

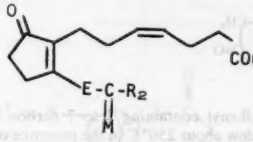
3,989,735

4.5-CIS-DIDEHYDRO-PGB₁ ANALOGS

Barney J. Magerlein, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 440,629, Feb. 7, 1974, Pat. No. 3,933,889, which is a continuation-in-part of Ser. No. 247,993, April 27, 1972, abandoned. This application Nov. 7, 1975, Ser. No. 629,884
Int. Cl.² C07C 177/00
U.S. Cl. 260—468 D 32 Claims

1. An optically active compound of the formula

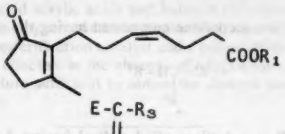


or a racemic compound of that formula and the mirror image thereof, wherein M is

or

wherein R_5 is hydrogen, methyl, or ethyl; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_2 is alkyl of 2 to 4 carbon atoms, inclusive, substituted with zero to 2 fluoro, inclusive; and wherein E is trans-CH=CH— or $-CH_2CH_2-$; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

10. An optically active compound of the formula

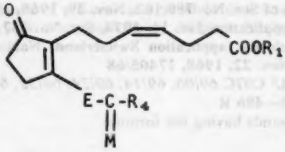


or a racemic compound of that formula and the mirror image thereof, wherein M is

or

wherein R_5 is hydrogen, methyl, or ethyl; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_3 is branched-chain alkyl of 5 carbon atoms or alkyl of 5 carbon atoms substituted with one or 2 fluoro; and wherein E is trans-CH=CH— or $-CH_2CH_2-$; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

17. An optically active compound of the formula

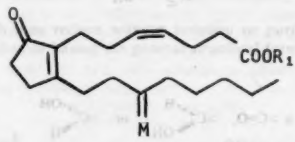


or a racemic compound of that formula and the mirror image thereof, wherein M is

or

wherein R_5 is hydrogen, methyl, or ethyl; wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; and wherein R_4 is alkyl of 6 to 10 carbon atoms, inclusive, substituted with zero to 2 fluoro, inclusive; and wherein E is trans-CH=CH— or $-CH_2CH_2-$; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

29. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein M is

or

wherein R_5 is hydrogen, methyl, or ethyl; and wherein R_1 is hydrogen or alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one, 2, or 3 chloro or alkyl of one to 4 carbon atoms, inclusive; including the lower alkanoates thereof, and the pharmacologically acceptable salts thereof when R_1 is hydrogen.

3,989,736

PROSTAGLANDIN 5-INDANYL ESTERS

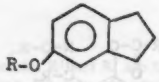
Thomas K. Schaaf, Old Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 321,664, Jan. 8, 1973, abandoned. This application May 17, 1974, Ser. No. 471,032

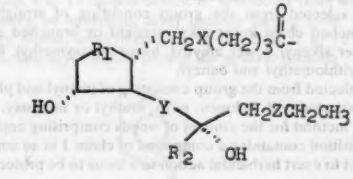
Int. Cl.² C07C 177/60

U.S. Cl. 260—468 D **7 Claims**

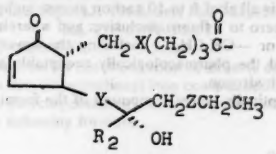
1. A compound of the formula:

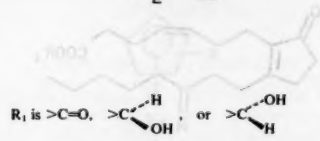


wherein R is



or





R_2 is hydrogen or C_1–C_4 lower alkyl;
X is CH_2CH_2 or cis CH=CH;
Y is CH_2CH_2 or trans CH=CH; and
Z is CH_2CH_2 or cis CH=CH, provided that when Z is cis CH=CH, X is cis CH=CH, and Y is trans CH=CH.

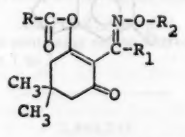
3,989,737

2-CYCLOHEXENE-1-ONE DERIVATIVES

Mikio Sawaki, Takaoka; Isao Iwataki, Odawara; Yoshihiko Hirono, Hiratsuka, and Hisao Ishikawa, Odawara, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

Filed Dec. 11, 1974, Ser. No. 531,810
Claims priority, application Japan, Dec. 24, 1973, 48-143556
Int. Cl.² C07C *131/08*
U.S. Cl. 260—472 **20 Claims**

1. A compound of the formula



wherein
R_1 is selected from the group consisting of phenyl and straight or branched chain alkyl;
R_2 is selected from the group consisting of straight or branched chain lower alkyl, straight or branched chain lower alkenyl, lower alkynyl, lower alkoxymethyl, lower alkylthiomethyl and benzyl;
R is selected from the group consisting of phenyl and phenyl substituted with halogen, nitro, methyl or methoxy.

11. A method for the control of weeds comprising applying a composition containing a compound of claim **1** in an amount sufficient to exert herbicidal action to a locus to be protected.

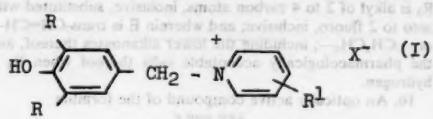
3,989,738

METHOD OF PREPARING PHENOLIC ANTIOXIDANTS BY CONDENSING ACTIVE METHYLENE COMPOUNDS WITH 3,5-DI-TERT ALKYL-4-HYDROXYBENZYLPYRIDINIUM SALTS

Richard H. Kline, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

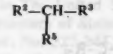
Filed July 21, 1975, Ser. No. 597,803
Int. Cl.² C07C *69/76, 49/82, 79/22, 121/50*
U.S. Cl. 260—473 S **4 Claims**

1. A process of producing a phenolic antioxidant comprising reacting in solution, in the presence of a base, a combination comprised of a pyridinium salt having the structure



(I)

and an active methylene compound having the structure



(II)

wherein R is a tertiary alkyl radical having 4 to 8 carbon atoms, R^1 is selected from the group consisting of hydrogen, methyl and ethyl and X is a halogen radical selected from the group consisting of chloro, bromo and iodo, wherein R^5 is selected from the group consisting of hydrogen and alkyl radicals containing 1 to 4 carbon atoms, and wherein R^2 and R^3 are selected from the group consisting of —$COOR^4$, —COR^4, —CN and —NO_2, wherein R^4 is an alkyl radical containing from 1 to 4 carbon atoms, with the proviso that when R^2 is NO_2, R^3 can also be hydrogen or an alkyl radical containing 1 to 4 carbon atoms, wherein the reaction temperature is from 0° C. to the boiling point of the solvent and wherein the molar ratio of I to II is from 2.5/1 to 1/10.

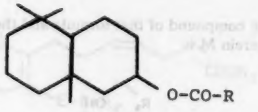
3,989,739

OXYGENATED DECALIN DERIVATIVES

Paul A. Stadler, Biel-Benken; Albert Eschenmoser, Kusnacht, Zurich, and Erling Sundt, Pinchat-Geneva, all of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 316,071, Dec. 18, 1972, abandoned, which is a division of Ser. No. 780,162, Nov. 29, 1968, abandoned. This application Jan. 11, 1974, Ser. No. 432,643
Claims priority, application Switzerland, Nov. 29, 1967, 16745/67; Nov. 22, 1968, 17405/68
Int. Cl.² C07C *69/06, 69/14, 69/24, 69/52, 69/54*
U.S. Cl. 260—486 R **2 Claims**

1. Compounds having the formula



wherein R represents hydrogen, or an unsubstituted linear or branched alkyl having 1 to 6 carbon atoms, or an unsubstituted linear or branched alkenyl comprising 2 to 6 carbon atoms.

3,989,740
METHOD OF PREPARING POLYALKYLENE GLYCOL ACRYLATES

Jerry A. Broussard, and Gene J. Fisher, both of Corpus Christi, Tex., assignors to Celanese Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 462,709, April 22, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,399
Int. Cl.² C07C 69/54
U.S. Cl. 260—486 R **17 Claims**

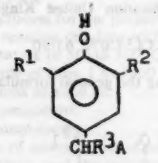
1. A method of preparing polymerizable monomeric esters of a polyalkylene glycol or the ether-alcohol derivative of an alkylene glycol or polyalkylene glycol, which glycol or derivative has a tendency to form thermally unstable peroxides, which process comprises heating a mixture of said glycol or derivative, a hydrocarbon solvent, and an effective amount of a caustic or sodium borohydride for a time and at a temperature sufficient to decompose said peroxide; and reacting said treated glycol or derivative with an α,β-unsaturated monocarboxylic acid selected from the group consisting of acrylic acid, alkyl substituted acrylic acids and halogen substituted acrylic acids in a non-oxygen containing atmosphere in the presence of a suitable esterification catalyst and a polymerization inhibitor which is effective in the absence of oxygen for a time and at a temperature sufficient to obtain the desired yield of monomeric ester.

3,989,741
PREPARATION OF ANTIOXIDANTS

Dane K. Parker, Canton, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

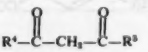
Filed Jan. 22, 1974, Ser. No. 435,569
Int. Cl.² C07C 69/54
U.S. Cl. 260—486 R **8 Claims**

1. A process comprising reacting compounds having the general structural formula



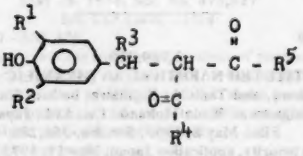
(I)

with compounds having the general structural formula



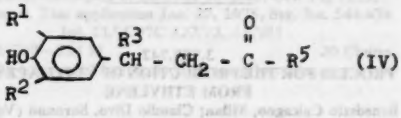
(II)

in the presence of a basic catalyst while dissolved in ethanol solvent to yield a monoalkylated diketone having the structural formula



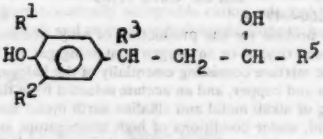
(III)

which is refluxed in solution to produce an alkylated ketone having the structural formula



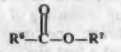
(IV)

and which may reduce without isolation or purification to form an alcohol having the general structural formula



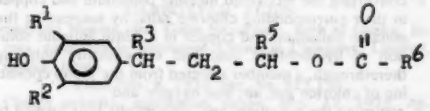
(V)

wherein the ethanol solvent is removed and replaced with an ester forming compound of the general formula



(VI)

while in the presence of a catalytic amount of an ester interchange catalyst to yield an ester with the structural formula



(VIII)

wherein in said formulas R^1 and R^2 are the same or different radicals selected from the group consisting of tertiary alkyl radicals having from 4 to 12 carbon atoms, R^3 is selected from the group consisting of hydrogen and n-alkyl radicals having from 1 to 20 carbon atoms, A is selected from the group consisting of chloro, bromo and iodo, R^4 and R^5 are the same or different radicals selected from the group consisting of alkyl radicals having from 1 to 10 carbon atoms, alkylene radicals having from 2 to 10 carbon atoms, aryl radicals having from 6 to 12 carbon atoms, R^6 is selected from the group consisting of hydrogen, alkyl radicals having from 1 to 17 carbon atoms, aralkyl radicals having from 7 to 12 carbon atoms, and aryl radicals having the general formula

(VII)

wherein X is selected from the group consisting of amino, nitro, chloro, alkoxy and alkyl radicals having from 1 to 17 carbon atoms and wherein R^7 is an alkyl radical having from 1 to 10

3,989,742

PROCESS FOR THE PRODUCTION OF VINYL ACETATE FROM ETHYLENE

Benedetto Calcagno, Milan; Claudio Divo, Saronno (Varese), and Marcello Ghirga, Bresso (Milan), all of Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Oct. 1, 1969, Ser. No. 862,913

Claims priority, application Italy, Oct. 12, 1968, 22412/68

The portion of the term of this patent subsequent to Mar. 23, 1993, has been disclaimed.

Int. Cl.² C07C *67/05*

U.S. Cl. 260—497 A 6 Claims

1. In a process for the production of vinyl acetate where ethylene and oxygen or an oxygen containing gas are fed into a catalytic mixture consisting essentially of the halogenides of palladium and copper, and an acetate selected from the group consisting of alkali metal and alkaline earth metal acetates in acetic acid, under conditions of high temperature and pressure, wherein the catalytic activity of said catalytic mixture becomes reduced during the progress of the reaction the improvement which comprises:

a. removing the catalytic mixture from the reaction vessel in which the vinyl acetate is being produced;

b. recovering said copper and palladium in their elemental form by deposition in a Daniell-type galvanic cell, which consists of two compartments separated by a member selected from the group consisting of a porous baffle and an ion exchange membrane, one compartment containing the catlytic mixture and a first electrode upon which the copper and palladium are deposited, and the other compartment containing an aqueous acid electrolyte and a further electrode, electrically connected to the first electrode, consisting of an element of electrochemical potential algaebraically lower than the electrochemical potentials of copper and palladium;

c. converting the recovered metallic palladium and copper to their corresponding chloride salts, by suspending the metallic palladium and copper in a dilute aqueous solution of hydrochloric acid and subsequently bubbling therethrough, a member selected from the group consisting of chlorine gas, air, and oxygen; and

d. returning the palladium and copper salts thus formed to the reaction vessel in which the vinyl acetate is being produced,

the temperature of the catalytic mixture during deposition of said metals being maintained between 40° C and 85° C.

3,989,743

PROCESS FOR THE PREPARATION OF 4,4'-DIAMINOSTILBENE-2,2'-DISULPHONIC ACID

Rudolf Braden, Odenthal-Scheuren, and Hans Knupfer, Schildgen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 11, 1974, Ser. No. 531,751

Claims priority, application Germany, Dec. 18, 1973, 2362781

Int. Cl.² C07C *143/56*

U.S. Cl. 260—510 6 Claims

1. Process for the preparation of 4,4'-diaminostilbene-2,2'-disulphonic acid or its alkali metal salt by catalytic hydrogenation of an alkali metal salt of 4,4'-dinitrostilbene-2,2'-disulphonic acid in an aqueous medium, characterized in that the hydrogenation is carried out with a catalyst consisting essentially of cobalt at 70°–180° C, 5–150 bars of hydrogen, and a pH of 6.0–8.5.

3,989,744

11-SUBSTITUTE D-11-DESOXY-PGE ANALOGUES

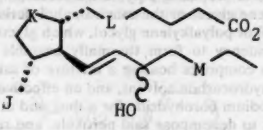
Warren Dexter Woessner; Henry Clifford Arndt; William Gerard Biddlecom, all of Madison; George Peter Peruzzotti, Middleton, and Charles John Sih, Madison, all of Wis., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed July 30, 1973, Ser. No. 384,075

Int. Cl.² C07C *61/38, 69/74, 65/14, 65/22*

U.S. Cl. 260—514 D 3 Claims

1. A compound of the formula



wherein:

J is selected from the group consisting of cycloalkyl of 3 to 8 carbon atoms, and 3-hydroxy-1-alkenyl of 3 to 8 carbon atoms;

K is carbonyl;

L and M respectively are vinylene and ethylene radicals; and,

Q is selected from the group consisting of hydrogen, lower alkyl of 1 to 3 carbon atoms, and a nontoxic cation.

3,989,745

BENZOYL-BENZOIC ACID DERIVATIVES

Peter Werner Feit, Gentofte; Ole Bent Tvaermose Nielsen, Vanlose, and Herta Bruun, Graested, all of Denmark, assignors to Lovens Kemiske Fabrik Produktionsaktieselskab, Ballerup, Denmark

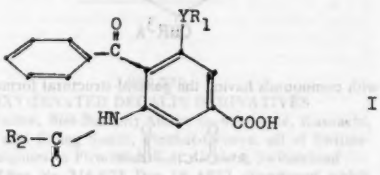
Filed June 7, 1974, Ser. No. 477,180

Claims priority, application United Kingdom, June 22, 1973, 29875/73

Int. Cl.² C07C *65/20*

U.S. Cl. 260—517 7 Claims

1. A compound having the general formula:



I

in which R_1 represents a straight or branched C_1–C_6 alkyl or alkenyl radical, or a C_1–C_3 alkyl radical substituted with phenyl; R_2 stands for hydrogen or a C_1–C_3 alkyl radical, optionally being substituted with halogen or a di-(lower alkyl) amino radical; Y stands for oxygen; and the pharmaceutically acceptable, non-toxic salts thereof.

3,989,746

SUBSTITUTED NAPHTHYL ANTHRANILIC ACIDS

Fujio Nohara, and Tomoaki Fujinawa, both of Kamiichi, Japan, assignors to Ikeda Mohando Co., Ltd., Japan

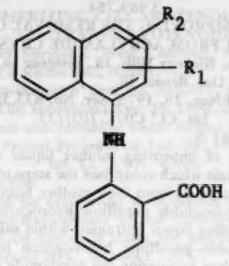
Filed May 8, 1973, Ser. No. 358,291

Claims priority, application Japan, May 11, 1972, 47-46665

Int. Cl.² C07C *101/70*

U.S. Cl. 260—518 A 6 Claims

1. A di-substituted naphthyl anthranilic acid compound of the formula:



or a pharmaceutically acceptable salt thereof, in which R_1 is methyl or halogen and R_2 is lower alkyl having 1 to 6 carbon atoms or a halogen atom having an atomic number equal to or lower than 35.

3,989,747

PRODUCTION OF PROPIONIC ACID

John H. Craddock, Ballwin; James F. Roth, St. Louis; Arnold Hershman, St. Louis, and Frank E. Paulik, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 59,410, July 30, 1970, abandoned, which is a continuation-in-part of Ser. No. 752,746, Aug. 15, 1968, Pat. No. 3,579,552. This application May 28, 1974, Ser. No. 473,464

Int. Cl.[2] C07C *51/14*

U.S. Cl. 260—533 AN **8 Claims**

1. A one-step process for the preparation of propionic acid which comprises reacting ethylene with carbon monoxide and water at a temperature of 50° to 300° C and a partial pressure of carbon monoxide of from 1 to 1500 psia in the presence of catalytic proportions of each of:

1. a rhodium component;
2. a bromide component,

wherein the range of atomic ratios of said bromide to rhodium is from 40:1 to 350:1, and the process is catalytic both with respect to the rhodium and the bromide.

3,989,748

PRODUCTION OF PROPIONIC ACID

Frank E. Paulik; Arnold Hershman; James F. Roth, all of St. Louis, and John H. Craddock, Ballwin, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 59,612, July 30, 1970, abandoned, which is a continuation-in-part of Ser. No. 752,795, Aug. 15, 1968, Pat. No. 3,579,551. This application May 28, 1974, Ser. No. 473,527

Int. Cl.[2] C07C *51/14*

U.S. Cl. 260—533 AN **8 Claims**

1. A one-step process for the preparation of propionic acid which comprises reacting ethylene with carbon monoxide and water at a temperature of 50° C to 300° C and a partial pressure of carbon monoxide of from 1 to 1500 psia in the presence of catalytic proportions of each of:

1. an iridium component;
2. a bromide component, wherein the range of atomic ratios of said bromide to iridium is from 3:1 to 300:1, and the process is catalytic both with respect to the iridium and the bromide.

3,989,749

11,12-SECOPROSTAGLANDINS

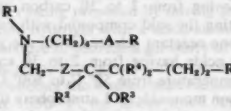
Edward J. Cragoe, Jr., Lansdale, and James H. Jones, Blue Bell, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 407,008, Oct. 17, 1973, abandoned. This application Jan. 27, 1975, Ser. No. 544,474

Int. Cl.[2] C07C *127/15*, *157/05*

U.S. Cl. 260—534 M **30 Claims**

1. The compound having the following formula:



wherein R is carboxy, a carboxy salt, said salt being formed from a pharmaceutically acceptable cation selected from the group of metals and amines, or derivatized carboxy having the formula

—COOY

wherein

Y is alkyl having 1–10 carbon atoms;

A is ethylene, trimethylene, α-methylethylene, β-methylethylene, α,α-dimethylethylene, or β, β-dimethylethylene;

R^1 is carbamoyl or thiocarbamoyl;

Z is methylene, ethylene, trimethylene, tetramethylene, vinylene, or ethynylene;

R^2 is independently hydrogen or methyl;

R^3 is hydrogen or loweralkanoyl;

R^4 is selected independently from the group consisting of hydrogen and methyl;

R^5 is selected from the group consisting of hydrogen, lower alkyl of 1–4 carbon atoms, vinyl and 2,2,2-trifluoroethyl.

3,989,750

RACEMIZATION OF OPTICALLY ACTIVE 2,2-DIMETHYL-3-(1'-ALKENYL)-CYCLOPROPANE-1-CARBOXYLIC ACIDS

Tsuneyuki Nagase, and Gohu Suzukamo, both of Osaka, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

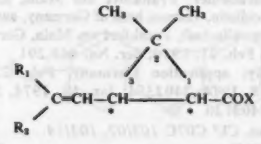
Filed Nov. 8, 1974, Ser. No. 522,130

Claims priority, application Japan, Nov. 12, 1973, 48-127502

Int. Cl.[2] C17C *61/18*

U.S. Cl. 260—544 L **9 Claims**

1. A method for the racemization of an optically active 2,2-dimethyl-3-(1'-alkenyl)-cyclopropane-1-carboxylic acid halide of the formula:



wherein R_1 and R_2 are each a hydrogen atom or an alkyl group having 1 to 4 carbon atoms or, when taken together with the carbon atom to which they are attached, represent a cycloalkylidene group having 4 to 6 carbon atoms and X is a halogen atom, which comprises contacting the acid halide with a Lewis acid in an amount of about 1/2000 to 1/2 mole per 1 mole of the acid halide at a temperature sufficient to permit the racemization to proceed until a trans-rich racemic mixture is obtained.

3,989,751

PROCESS FOR THE PREPARATION OF CARBOXYLIC ANHYDRIDES FROM OLEFINIC HYDROCARBONS

Denis Forster, University City, and Arnold Hershman, Creve Coeur, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 12, 1974, Ser. No. 531,946
Int. Cl.² C07C 51/54
U.S. Cl. 260—546 9 Claims

1. An improved process for the production of carboxylic acid anhydrides by the reaction of ethylenically unsaturated feedstock compounds having from 2 to 30 carbon atoms, which comprises contacting the said compound with carbon monoxide, and at least one reactant selected from the group consisting of carboxylic acids having from 2 to 30 carbon atoms and water, at a temperature from 50° C to 300° C and a partial pressure of carbon monoxide of 1 atmosphere to 200 atmospheres, the improvement comprising the production of carboxylic acid anhydrides in the presence of a catalyst system comprised of:

1. a cobalt or nickel compound and
2. an iodide component subject to the conditions that the atomic ratio of iodide to cobalt or nickel is from 1:1 to 300:1, and
3. hydrogen as a catalyst preserver or regenerator component in the molar ratio of 5:1 to 10,000:1 relative to the said cobalt or nickel.

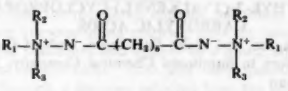
3,989,752

NOVEL DIFUNCTIONAL COMPOUNDS AS LATENT DIISOCYANATES

William D. Emmons, Huntingdon Valley, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 563,095, July 6, 1966, abandoned. This application Jan. 5, 1970, Ser. No. 832
Int. Cl.² C07C 109/087
U.S. Cl. 260—561 H 1 Claim

1. A compound of the formula



wherein R_1, R_2 and R_3 are each methyl.

3,989,753

PROCESS FOR THE PREPARATION OF OXAMIDE

Wilhelm Riemenschneider, Frankfurt am Main, and Peter Wegener, Schneidhain, Taunus, both of Germany, assignors to Hoecht Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 21, 1974, Ser. No. 444,291
Claims priority, application Germany, Feb. 23, 1973, 2308941; Jan. 18, 1974, 2402354; Jan. 18, 1974, 2402352; Jan. 23, 1974, 2403120
Int. Cl.² C07C 103/02, 103/14
U.S. CL. 260—561 K 29 Claims

1. A process for the preparation of oxalic acid diamide which comprises reacting hydrogen cyanide, oxygen and water in a catalyst solution containing copper ions, nitrate ions and a low molecular weight aliphatic carboxylic acid, said catalyst solution containing from about 3% to about 80% of water by weight, from about 19% to about 96% of carboxylic acid by weight and at least about 0.2% of copper nitrate by weight and isolating oxalic acid diamide from said catalyst solution.

3,989,754

METHOD OF IMPROVING THE REMOVAL OF MOTHER LIQUOR FROM ACRYLAMIDE CRYSTALS

John R. Hurlock, Hickory Hills, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Nov. 19, 1975, Ser. No. 633,358
Int. Cl.² C07C 103/133
U.S. Cl. 260—561 N 3 Claims

1. A method of improving mother liquor removal from acrylamide crystals which comprises the steps of precipitating the acrylamide crystals from their mother liquor in the presence of a water-insoluble paraffinic hydrocarbon liquid and allowing the mother liquor entrained within said crystals and the water-insoluble paraffinic hydrocarbon liquid to drain therefrom and then recovering the acrylamide crystals.

3,989,755

PRODUCTION OF OXIMES BY THE REACTION OF CARBON MONOXIDE WITH NITROCOMPOUNDS

John J. McCoy, Media; John G. Zajacek, Strafford, both of Pa., and Karl E. Fuger, Therwil, Switzerland, assignors to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 372,457, June 21, 1973, abandoned. This application Feb. 20, 1975, Ser. No. 551,487
Int. Cl.² C07C 131/04
U.S. Cl. 260—566 A 20 Claims

1. A method for the production of a material selected from the group consisting of an oxime, a ketone and mixtures thereof which comprises contacting a nitrocompound containing up to 20 carbon atoms selected from the group consisting of primary saturated aliphatic mono-nitrocompounds, secondary saturated aliphatic mono-nitrocompounds and saturated cycloaliphatic mono-nitrocompounds with carbon monoxide at a pressure in the range of from 10 atmospheres to 200 atmospheres, at a temperature in the range of from 50° to 200° C. in the presence of a catalyst selected from the group consisting of metallic selenium, inorganic compounds of selenium selected from selenium dioxide, titanium diselenide, sodium selenite, zinc selenite, zinc selenide, tungsten selenide, selenium sulfide or selenium disulfide, and combinations thereof and in the presence of a base selected from the group consisting of aliphatic amines, aliphatic-aromatic amines, aromatic heterocyclic amines, metals of carboxylic acids and metal hydroxides.

3,989,756

PROCESS FOR THE PRODUCTION OF HALOGENATED AROMATIC PRIMARY AMINES

Masatomo Fujise, Wako; Yasuo Nakano, Tokyo, and Koji Isobe, Yono, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 6, 1974, Ser. No. 503,742
Claims priority, application Japan, Sept. 6, 1973, 48-100541
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² C07C 85/11
U.S. Cl. 260—580 8 Claims

1. A process for the production of halogenated aromatic primary amines by catalytic hydrogenation of halogenated aromatic nitro compounds, which comprises hydrogenating a halogenated aromatic nitro compound in the presence both of Raney nickel and of a dehalogenation inhibitor selected from the group consisting of dicyandiamide, cyanamide and calcium cyanamide, in an inert solvent at a temperature in the range from 40° to 150°C under an elevated hydrogen pressure.

3,989,757

ISOMERIZING CIS-CAROTENOIDS TO ALL-TRANS-CAROTENOIDS

Joseph Donald Surmatis, West Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 392,597, Aug. 29, 1973, abandoned. This application Apr. 29, 1974, Ser. No. 465,202

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C07C *45/00*

U.S. Cl. 260—598 **8 Claims**

1. A process for converting a cis-isomer of a solid carotenoid to an all-trans-isomer of the carotenoid, comprising: immersing the cis-isomer in water and heating to a temperature of from about 50°C. to about 120°C.

3,989,758

MONOACETALS OF UNSATURATED ALIPHATIC DIALDEHYDES

Rudolf Ruegg, Bottmingen, and Ulrich Schwieter, Reinach, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

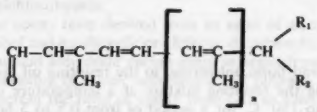
Division of Ser. No. 808,664, March 19, 1969, Pat. No. 3,665,039, which is a division of Ser. No. 323,156, Nov. 12, 1963, Pat. No. 3,466,335. This application Oct. 14, 1971, Ser. No. 189,411

Claims priority, application Switzerland, Nov. 16, 1962, 13430/62; May 17, 1963, 6208/63

Int. Cl.² C07D *47/20*; **C07W** *307/26*

U.S. Cl. 260—602 **5 Claims**

1. A compound of the formula:



wherein

n is an integer 0 or 1;

R_1 and R_2 individually are alkoxy containing from 1 to 4 carbon atoms; and R_1 and R_2 taken together form the ethylenedioxy group.

3,989,759

HYDROFORMYLATION PROCESS OVER CATALYST HAVING SILICA ALUMINA SUPPORT WITH SEPARATE ALUMINA PHASE AND NOBLE METAL AND COBALT OR NICKEL

Jin Sun Yoo, South Holland, Ill., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation of Ser. No. 51,659, July 1, 1970, abandoned. This application Feb. 18, 1975, Ser. No. 550,247

Int. Cl.² C07C *45/08*

U.S. Cl. 260—604 HF **5 Claims**

1. In a process for the hydroformylation of olefin hydrocarbons of 2 to about 16 carbon atoms in contact with a catalyst composition comprises a minor, catalytically effective amount of cobalt modified by a smaller amount of a platinum group metal, and further modified by a triorganophosphine electron donor ligand, each ligand having three hydrocarbon groups devoid of olefinic and acetylenic unsaturation and selected from the group consisting of lower alkyl, monocyclic aryl, alkylmonocyclicaryl, monocyclicaraalkyl, and cycloalkyl groups, said hydroformylation being conducted at a temperature of from about 60° to 400° C. and at a pressure from about 500 psig to a 3000 psig and an hourly space velocity of weight of olefin per weight of catalyst of from about 1 to to about 20, the hydrogen to carbon monoxide mole ratio being from about 1:1 to about 5:1, the improvement which comprises supporting said cobalt and said platinum group metal components upon a solid-acidic support containing a separate phase of alumina, the total catalyst composition containing 0.01 to 0.03 weight per cent of noble metal of the group consisting of platinum, palladium, rhodium, osmium, iridium, ruthenium, and mixtures thereof, and 0.2 to 0.6 weight per cent cobalt, said support being calcined and comprising 45 to 95 weight per cent amorphous acidic calcined silica-alumina having a Cat-A activity of about 30, and about 5–55 weight per cent separate phase alumina, the total alumina content of said support having about 20 to 70 weight per cent, said separate phase alumina resulting from the calcination of a mixture of amorphous hydrous alumina and alumina monohydrate; said support containing less than 1.5 weight per cent sodium, said support being prepared by mixing together a separate, phase alumina hydrogel with a silica-alumina hydrogel, dewatering the mixture to provide a gel slurry of about 14 weight per cent solids, spray-drying said slurry, washing the spray-dried material, pelleting the washed material, and calcining the pellets at about 1350° F. for about three hours to provide calcined particles.

3,989,760

TRICYCLIC ALCOHOLS AND LITHIUM SALTS THEREOF

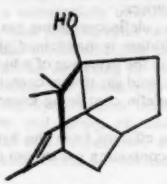
Kenneth K. Light, Long Branch, N.J.; Edward J. Shuster, Brooklyn, N.Y.; Joaquin F. Vinals, Red Bank, and Manfred Hugo Vock, Locust, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 485,554, July 3, 1974. This application Nov. 20, 1975, Ser. No. 633,800

Int. Cl.² C07C *35/22*

U.S. Cl. 260—617 F **3 Claims**

1. An organic tricyclic alcohol having the formula:



3,989,761

PRODUCTION OF ORTHOPHENYLPHENOLS

David E. Gross, St. Charles, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Aug. 8, 1975, Ser. No. 603,062

Int. Cl.² C07C *37/00*

U.S. Cl. 260—620 **19 Claims**

1. Process for the production of orthophenylphenol and substituted ortho-phenylphenols which comprises contacting dibenzofuran or a substituted dibenzofuran of the formula

where *n* is an integer from 0 to 2, *n* is an integer from 1 to 2, and each R may be selected from the group consisting of lower alkyl, cycloalkyl of 5 to 7 carbon atoms, alkylated cycloalkyl of 6 to 11 carbon atoms, phenyl, benzylphenyl, diphenylyl, alkylated phenyl of 7 to 19 carbon atoms, naphthyl, alkylated naphthyl of 11 to 14 carbon atoms, hydroxyl, carbanol, aldehydo, carboxy and R may also represent the addition of a 4 carbon chain in such a manner as to form a benzoid type fused ring structure, in the presence of hydrogen, at a temper-

ature of from 260° to 500° C., in the presence of a catalyst consisting essentially of a Group VIII element.

3,989,762

PROCESS FOR THE MANUFACTURE OF ALCOHOLS BY THE HYDRATION OF OLEFINS

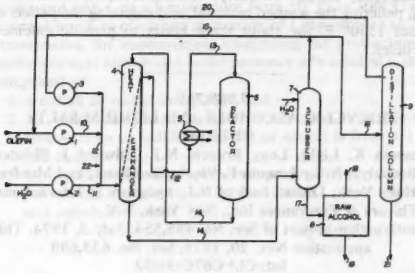
Wilhelm Ester, Herne, Germany, assignor to Veba-Chemie AG, Gelsenkirchen-Buer, Germany

Continuation-in-part of Ser. No. 813,311, April 3, 1969, abandoned. This application Nov. 25, 1970, Ser. No. 92,821

Claims priority, application Germany, Dec. 1, 1969, 1960139

Int. Cl.² C07C *29/04*

U.S. Cl. 260—641 **8 Claims**



1. Process for producing alcohols from olefins with olefin recycle which comprises:
   a. hydrating a C_{2-4} olefin containing gas stream wherein the olefin concentration is maintained at more than 90 vol. %, with water in the presence of a hydration catalyst in a hydration zone, said gas stream containing recycled olefin and make-up olefin containing lower and higher boiling impurities;
   b. separating the effluent from the hydration zone into a recycle olefin containing gas stream and an alcohol fraction;
   c. purifying and concentrating the recycle olefin containing gas stream by distillation under temperature and pressure conditions close to the critical point of said olefin, removing
      i. gaseous purified recycle olefin as the head product; and
      ii. the lower and higher boiling impurities present in the make-up olefin and hydrocarbon oils formed during the hydration step as the sump product; and
   d. recycling said purified olefin head product to hydration step (a).

3,989,763

METHOD FOR RECOVERING ALCOHOLS

Toshihiro Fujii, Neyagawa; Naoji Kurata, Nichinomiya, and Yukio Okuda, Toyonaka, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 219,789, Jan. 21, 1972, abandoned, which is a continuation-in-part of Ser. No. 816,326, April 15, 1969, abandoned. This application Sept. 20, 1974, Ser. No. 507,885

Claims priority, application Japan, Apr. 17, 1968, 43-25230

Int. Cl.² C07C *29/24*

U.S. Cl. 260—643 A **9 Claims**

1. A process for the recovery of alcohols from a mixture produced by the liquid phase oxidation of mixed aliphatic saturated hydrocarbons having 10 to 20 carbon atoms with a gas containing molecular oxygen in the presence of a boron compound selected from the group consisting of ortho-boric acid, meta-boric acid, boric anhydride, and boric esters, comprising the steps of:
   1. immediately contacting the mixture with sufficient water to hydrolyze the borate esters of the alcohols formed at a temperature in the vicinity of 100° C., separating the resulting oil layer from the aqueous layer, and removing the resulting aqueous layer containing boric acid;
   2. saponifying the oil layer of step (1) with an alkali, at a temperature in the range of from 100° to 200° C. and a pressure of at least one atmosphere, to decrease the saponification value to less than one, and water-washing the oil layer;
   3. adding a sufficient amount of a boron compound selected from the group consisting of ortho-boric acid, meta-boric acid, and boric anhydride, to the resulting oil layer and heating the resulting mixture at a temperature of from 100° to 150° C. for a period of from 0.5 to 3 hours, to convert all alcohols therein into their borates;
   4. distilling the resulting mixture of step (3) to separate predominantly unreacted hydrocarbons from the residue;
   5. contacting the residue of step (4) with water, at about 100° C. and for about 1 hour, separating the aqueous layer to remove the resulting boric acid from the oil layer, and water-washing the oil layer; and
   6. fractionally distilling the oil layer obtained in step (5) to recover the desired alcohols.

3,989,764

PREPARATION OF AROMATIC NITROSO COMPOUNDS

John Mathers Woolley, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Sept. 4, 1973, Ser. No. 394,248

Claims priority, application United Kingdom, Sept. 14, 1972, 42693/72

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.² C07C *81/00, 81/02, 81/06*

U.S. Cl. 260—647 **7 Claims**

1. In the process for manufacture of nitroso compounds of the benzene series by heating an aromatic nitrobenzene compound with a reducing agent in the presence of a catalyst having a lattice consisting of a heavy metal selected from antimony, bismuth, cerium, chromium, cobalt, copper, germanium, gold, iron, lanthanum, lead, manganese, mercury, molybdenum, neodymium, nickel, rhenium, silver, tantalum, thallium, thorium, tin, titanium, tungsten, vanadium and zirconium, in association with oxygen atoms or hydroxyl, carbonate or phosphate ions and having at least one other of said heavy metals forming impurity in the lattice, the improvement comprising using as the sole reducing agent a member selected from the group consisting of lower aliphatic primary alcohols.

3,989,765

SYNTHETIC LIME MIX

Robert John Steltenkamp, Somerset, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 125,792, March 18, 1971, abandoned. This application Nov. 9, 1973, Ser. No. 414,394

Int. Cl.² C07C *1/20*

U.S. Cl. 260—666 A 1 Claim

1. A method of making a synthetic lime mix which includes 1-methyl-1,3-cyclohexadiene comprising the steps of refluxing (1) citral and (2) citric acid and water, the weight ratio of citral to said acid being about 1:1 to 20:1 said refluxing step carried out for about ½ to 5 hours and thereafter distilling the refluxed material.

3,989,766

EPOXY RESIN COMPOSITION

Shunichiro Nishizaki, Kobe; Hiroshi Teratani, and Shoji Takagi, both of Osaka, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha and Mitsubishi Chemical Industries Ltd., both of Tokyo, Japan

Filed Feb. 25, 1974, Ser. No. 445,582

Claims priority, application Japan, Feb. 24, 1973, 48-22574

Int. Cl.² C08G *45/00*

U.S. Cl. 260—830 TW 6 Claims

1. An epoxy resin composition which comprises:

A. an epoxy resin having a number average molecular weight of 600–2000 and having at least two epoxy groups per molecule prepared by condensing a bisphenol and an epichlorohydrin;

B. an epoxy resin derived from an ester of an alkadienealcohol and an alicyclic or aliphatic dicarboxylic acid; and

C. an acid anhydride curing agent selected from the group consisting of maleic anhydrides and phthalic anhydrides wherein the ratio of epoxy resin (A) to epoxy resin (B) is 80:20 to 20:80 by weight parts.

3,989,767

POWDER COATING RESIN COMPOSITIONS OF GLYCIDYL COPOLYMERS HAVING AN INTERNAL FLOWING AGENT

Minoru Homma, Sakai; Akio Shoji, Osaka, and Hidehisa Nakamura, Osaka, all of Japan, assignors to Dainippon Ink & Chemicals, Incorporated, Tokyo, Japan

Filed Feb. 28, 1975, Ser. No. 554,098

Claims priority, application Japan, Mar. 5, 1974, 49-24800; July 9, 1974, 49-77814; Aug. 1, 1974, 49-87506

Int. Cl.² C08L *63/02, 63/10, 67/06*

U.S. Cl. 260—834 10 Claims

1. A powder coating resin composition comprising (A) 10 to 90% by weight of a glycidyl- or methyl glycidyl-containing copolymer and (B) 90 to 10% by weight of a polycarboxylic compound, said copolymer (A) being prepared by polymerizing (1) 5 to 40% by weight of at least one ethylenically unsaturated monomer selected from the group consisting of glycidyl-containing ethylenically unsaturated monomers and methyl glycidyl-containing ethylenically unsaturated monomers and (2) 20 to 90% by weight of at least one other ethylenically unsaturated monomer in the presence of (3) 5 to 40% by weight of a polyester resin containing an ethylenically unsaturated bond and having an acid number of not more than 10 KOH mg/g and a hydroxyl number of 20 to 300 KOH mg/g, said polyester resin being derived from 0.1 – 10 equivalent % of an ethylenically unsaturated polycarboxylic acid, 30 to 49.9 equivalent % of a polycarboxylic acid not containing an ethylenically unsaturated bond and 50 to 65 equivalent % of a polyhydric alcohol.

3,989,768

CHEMICALLY JOINED PHASE SEPARATED THERMOPLASTIC GRAFT COPOLYMERS

Ralph Milkovich, Murrysville, Pa., and Mutong T. Chiang, Palos Heights, Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Division of Ser. No. 433,314, Jan. 14, 1974, Pat. No. 3,879,494, which is a division of Ser. No. 282,099, Aug. 21, 1972, Pat. No. 3,786,116, which is a continuation-in-part of Ser. No. 244,205, April 14, 1972, Pat. No. 3,832,423, which is a continuation-in-part of Ser. No. 117,733, Feb. 22, 1971, abandoned. This application Mar. 28, 1975, Ser. No. 563,278

Int. Cl.² C08L *75/04*

U.S. Cl. 260—859 R 23 Claims

1. A chemically joined, phase separated thermoplastic graft copolymer of:

1. From 1 to about 95 percent by weight of a polymerizable macromolecular monomer having a substantially uniform molecular weight distribution; and

2. From about 99 to about 5 percent by weight of a copolymerizable prepolymer forming the polymeric backbones of said graft copolymer, said polymerizable macromolecular monomer forming linear polymeric prepolymer sidechains of said graft copolymer, wherein:

a. the polymeric backbones of the graft copolymer are comprised of polymerized units of a copolymerized comonomer, said copolymerized comonomer being joined to said sidechain-forming macromolecular monomer by a condensation reaction;

b. the linear polymeric sidechains of the graft copolymer consisting essentially of a polymerized macromolecular monomer, said macromolecular monomer comprising a linear polymer or copolymer having a molecular weight in the range from about 5,000 to about 50,000 and having a substantially uniform molecular weight distribution, such that its ratio of M_w/M_n is less than about 1.1, said macromolecular monomer being further characterized as having no more than one polymerizable moiety per linear polymer or copolymer chain, said copolymerization occurring between the polymerizable end group of said macromolecular monomer and said prepolymer, said last mentioned copolymerization being a condensation copolymerization; and

c. the linear polymeric sidechains of the graft copolymer which are copolymerized into the copolymeric backbone are separated by at least about 20 uninterrupted recurring monomeric units of said backbone polymer.

3,989,769

MODIFIED SYNTHETIC THERMOSETTING RESINS AND COMPOSITIONS CONTAINING SAME

Michael G. Bonnington, Dudley, England, assignor to British Industrial Plastics Limited, Manchester, England

Filed May 28, 1974, Ser. No. 474,003

Claims priority, application United Kingdom, June 5, 1973, 26897/73

Int. Cl.² C08L *67/06*

U.S. Cl. 260—873 4 Claims

1. A synthetic thermosetting resin comprising

i. an unsaturated polyester thermosetting resin, and

ii. 20 to 50 percent by weight, based on the total weight of (i) and (ii), of a polybutadiene selected from butadiene-based polymers having a vinyl content of up to 50 percent of the unsaturation thereof; hydroxyl-, carboxyl-, mercapto- and amino-terminated derivatives thereof.

3,989,770

THERMOPLASTIC MOULDING COMPOSITIONS

Richard Prinz, Leverkusen; Salah Elabd Elghani, Cologne; Winfried Fischer, Cologne, and Heinrich Alberts, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Apr. 30, 1974, Ser. No. 465,688

Claims priority, application Germany, May 4, 1973, 2322435

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.² C08L 67/06

U.S. Cl. 260—873 **12 Claims**

1. A thermoplastic molding composition comprising

i. from 5 to 95 percent by weight of at least one polycarbonate derived from a divalent phenol and

ii. from 95 to 5 percent by weight of at least one graft copolymer comprising

a. from 10 to 70 percent by weight of an ethylene/vinyl acetate copolymer containing from 25 to 75 percent by weight of vinyl acetate having grafted thereon

b. from 90 to 30 percent by weight of a copolymer prepared from a monomer mixture comprising

1. from 15 to 85 parts by weight of acrylonitrile, methacrylonitrile or a mixture thereof and

2. from 10 to 85 parts by weight of styrene, α-methylstyrene or a mixture thereof.

3,989,771

RUBBERMODIFIED STYRENE POLYMERS

Robert A. Reith, Glen Ellyn, and James Spanswick, Wheaton, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Apr. 30, 1975, Ser. No. 573,309

Int. Cl.² C08L 9/06

U.S. Cl. 260—880 R **12 Claims**

1. A method for producing an impact resistant polymer comprising:

a. adding to a polymerization feedstock, comprising 2 to 20% polybutadiene, styrene-butadiene or ethylene-propylene-diene monomer rubber dissolved in a vinyl aromatic monomer, an effective amount between 0.01 to 0.5 weight percent of an additive selected from the group consisting of bromine and carbon tetrabromide;

b. polymerizing the feedstock; and

c. recovering the polymer,

whereby the Izod value of the polymer is at least 0.6.

3,989,772

N,N-BIS-(PHOSPHONOMETHYL)-ACRYLAMIDES

Udo Winfried Hendricks, Cologne, and Klaus Walz, Bergisch-Neukirchen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

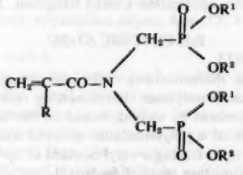
Filed Oct. 9, 1974, Ser. No. 513,487

Claims priority, application Germany, Oct. 12, 1973, 2351295

Int. Cl.² C07F 9/40

U.S. Cl. 260—932 **1 Claim**

1. N,N-bis-(Phosphonomethyl)-acrylamides of the formula



in which

R represents hydrogen or the methyl or ethyl radical and R^1 and R^2 independently of one another represent methyl, ethyl or chloroethyl.

3,989,773

METHOD FOR DECOLORIZING PHOSPHATE POLYESTERS

Richard J. Turley, Orange; Alexandre Ozolins, New Haven, and Robert B. Lauder, Fairfield, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed July 24, 1975, Ser. No. 598,614

Int. Cl.² C07F 9/09

U.S. Cl. 260—989 **13 Claims**

1. A method for decolorizing an off-color phosphate polyester represented by the formula

$$RX_a[OP(OR')_2]_n$$

wherein

R is an aliphatic hydrocarbon radical having 1–8 carbon atoms, or an aromatic hydrocarbon radical having 6–14 carbon atoms,

X is a halogen selected from chlorine, bromine and a mixture thereof,

a is an integer of 0–4,

n is an integer of 2–6, and

each R′ is independently a haloalkyl radical having 1–8 carbon atoms in which the halogen is chlorine, bromine or a mixture thereof,

which method comprises contacting said phosphate polyester with an effective decolorizing amount of a bleaching agent selected from the group consisting of chlorine, bromine, an aqueous hypochlorite solution and an aqueous hypobromite solution.

3,989,774

DEVICE AT INJECTION NOZZLE

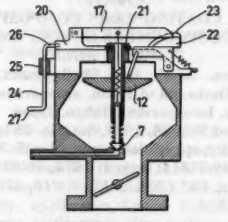
Knut Ludvig Winquist, Elmira, N.Y., assignor to Clean Air Company Inc. "CASCA", Apartado, Panama

Filed Jan. 28, 1975, Ser. No. 544,682

Claims priority, application Sweden, Nov. 25, 1974, 147653

Int. Cl.² F02M 7/22

U.S. Cl. 261—50 A **2 Claims**



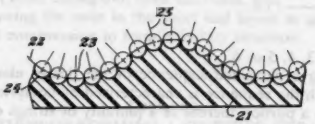
1. A device for adjusting the fuel-air ratio of injection carburetors comprising an injection nozzle, a valve body seatable within said nozzle and movable relative thereto to determine the amount of injected fuel, a rocker arm pivotable at one end and connected intermediate its ends to said valve body, a cam surface abutting the free end of said rocker arm, said cam surface defining a plurality of adjacent cam courses of different shape, said cam surface and said free end of said rocker arm being relatively movable laterally so that all the cam courses are independently contactable by said rocker arm end, a pressure sensing member which senses the velocity of the air passing through the carburetor, said member being connected to the valve body via the cam surface and rocker arm and a sensing means which senses the pressure in the induction pipe of the engine to which the carburetor is attached, said lateral movement being actuated by said means.

3,989,775

METHOD OF MAKING A RETRO-REFLECTIVE BEADED MATERIAL

James Jack, Manningtree, and Terence John Taylor-Brown, Ipswich, both of England, assignors to Bakelite Xylonite Limited, London, England

Continuation of Ser. No. 229,461, Feb. 25, 1972, abandoned.
This application Nov. 20, 1973, Ser. No. 417,578
Claims priority, application United Kingdom, Mar. 1, 1971, 5658/71
Int. Cl.² B29D 3/00, 9/10, 11/00
U.S. Cl. 264—1 21 Claims



1. A process for making a retro-reflective material which comprises uniformly distributing in a mono-layer over an area on the surface of a generally planar matrix of embossable plastics material, a plurality of substantialy spherical beads prepared from a transparent or translucent material having a refractive index in the range of 1.7 to 2.0 to form a beaded area on the surface of the matrix, pressing said beads into said beaded area until said bends become partially embedded in the surface of said matrix with exposed portions of the beads defining lenses, and embossing said beaded area so that axes of at least some of said lenses lie at varying angles with respect to the general plane of said plastics matrix.

3,989,776

PROCESS FOR PREPARING DOUBLE BASE PROPELLANTS CONTAINING BALLISTIC MODIFIER

Thomas E. Dunigan, Oak Ridge, and George C. Sisco, Budd Lake, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 7, 1970, Ser. No. 78,954
Int. Cl.² C06B 21/00
U.S. Cl. 264—3 B 6 Claims

1. In a solvent process for producing double base propellants by forming mixtures of water-wet nitrocellulose and nitroglycerin with stabilizers and plasticizers, then combining, colloiding, screening, extruding and drying said mixtures to form high strength propellants, the improvement therewith comprising adding the residue product of the interacting of normal lead beta resorcylate and monobasic cupric salicylate in a solvent medium at an elevated temperature, to the water-wet nitrocellulose to impart mesa ballistic characteristics to said propellant while retaining the propellant's physical characteristics.

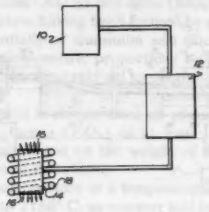
3,989,777

METHOD OF MAKING PERMANENT MAGNETS

Kenneth Horace Strawson, and Anthony Foden, both of Sheffield, England, assignors to Strawson Hydraulics (Consultants) Limited and Balfour Darwins Limited, both of Sheffield, England

Filed July 8, 1974, Ser. No. 486,682
Claims priority, application United Kingdom, July 16, 1973, 33851/73
Int. Cl.² B29C 3/00
U.S. Cl. 264—24 1 Claim

1. A method of producing a permanent magnet compact, comprising in combination the steps of mixing an orientable permanent magnetic material with water to form a slurry, partially dewatering the slurry, injecting the partially dewatered slurry into a mold cavity, allowing excess water to escape through a filter which comprises a part of the wall that surrounds said mold cavity, applying pressure to the partially dewatered slurry in the mold cavity to achieve a further dewatering thereof to form a finished compact of the required density, said finished compact fully filling the mold cavity, maintaining a magnetic field around the mold cavity so that



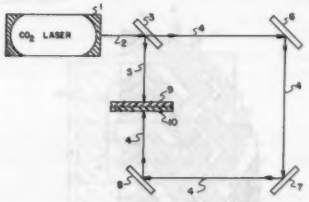
the particles of magnetic material are correctly oriented while still suspended in the slurry, maintaining the internal configuration of the mold unchanged throughout said further dewatering, and imparting vibrations to the mold during injection of the slurry and further dewatering of the magnetic material in the mold.

3,989,778

METHOD OF HEAT SEALING THERMOPLASTIC SHEETS TOGETHER USING A SPLIT LASER BEAM

Richard F. Osborne, Mauldin, S.C., assignor to W. R. Grace & Co., Duncan, S.C.

Filed Dec. 17, 1975, Ser. No. 641,858
Int. Cl.² B29C 27/02; B29D 9/00
U.S. Cl. 264—25 9 Claims



1. A method of sealing thermoplastic materials together comprisng the steps of:

a. providing a laser beam, said beam having a wavelength which is absorbed in said thermoplastic material;
b. placing the areas of said thermoplastic materials which are to be sealed together in intimate contact with each other;
c. splitting said laser beam into two components; and,
d. directing each of said beam components to impinge coaxially on a respective outer surface of said material whose surface is opposed to the area to be sealed.

3,989,779

METHOD OF CALIBRATING EXTRUDED FILAMENTS

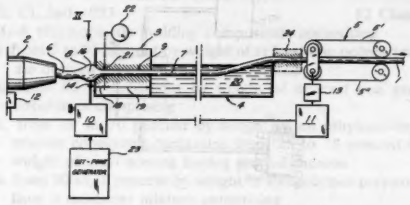
Erwin Brunnhofer, Lohfelden, Germany, assignor to Reifenhauser KG, Troisdorf, Germany and Gofini AG, Glarus, Switzerland

Filed July 10, 1975, Ser. No. 594,755

Claims priority, application Germany, July 11, 1974, 2433242

Int. Cl.² B29J 5/00; B29C 17/00

U.S. Cl. 264—40.2 **5 Claims**



1. In a method of making a synthetic-resin extrusion wherein a synthetic-resin strand is continuously expelled by an extruder at an extrusion rate, is then pulled through a calibrating tool at a withdrawal rate, and is cooled and hardened, with the strand forming a bank upstream of the calibrating tool, the improvement comprising the steps of:

generating an actual-value signal corresponding to the volume of said strand between said tool and said extruder,

comparing said actual-value signal with a set-point signal, and

varying one of said rates in accordance with the difference between said signals to equalize said signals.

3,989,780

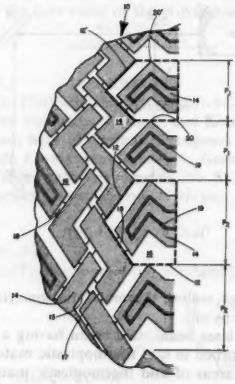
MODULATING NOISE PRODUCED BY ROTATING BODIES

William J. Vorih, Denver, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Division of Ser. No. 176,460, Aug. 31, 1971, Pat. No. 3,926,238. This application May 5, 1975, Ser. No. 574,801

Int. Cl.² B29H 5/02; G01M 17/02

U.S. Cl. 264—40.1 **7 Claims**



1. A method for producing a design element length and spacing pattern for a rotatable body divided into a plurality of such design elements, said design elements having at least two different pitch lengths and extending circumferentially about the rotatable body, said method comprising:

selecting relative pitch lengths of the design elements such that the ratio of shorter pitched elements to longer pitched elements is

$$\frac{2n-3}{2n-1}: 1.0,$$

$n = 3, 4, 5$ or 6, plus or minus one-half the distance to an adjacent nodal point ratio defined by the relation

$$\frac{n-1}{n}: 1.0,$$

$n = 2, 3, 4, 5$ or 6;

forming a patterned sequence of the design elements in which the sequence is characterized by comprising in at least a portion thereof of a plurality of strings of design elements, each string consisting of at least three consecutive design elements of substantially identical pitch length;

generating and displaying a simulated noise spectrum distribution of the sequence of design elements, the distribution comprising a series of peaks of particular individual amplitude corresponding to each harmonic frequency at the band of frequencies in question; and

modulating and flattening the distribution by varying the length and sequential positioning of said strings, using shorter string lengths with smaller pitch ratios to reinforce the natural design element frequency harmonic, and longer string lengths with larger pitch ratios to modulate the natural design element frequency harmonic and to reinforce the extremes of the natural design element frequency bandwidth.

3,989,781

PROCESS FOR PRODUCING A FIBROUS REINFORCED THERMOSETTING RESIN IMPREGNATED FOAMED POLYMERIC RESIN ARTICLE

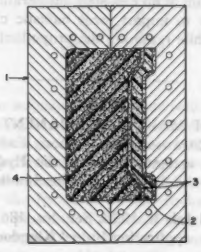
Peter R. Chant, Delft, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 279,396, Aug. 10, 1972, abandoned. This application June 20, 1974, Ser. No. 481,073

Claims priority, application United Kingdom, Aug. 17, 1971, 38524/71

Int. Cl.² B29D 27/04; B32B 27/04, 27/12, 5/28

U.S. Cl. 264—46.4 **3 Claims**



1. A process for producing a fibrous reinforced thermosetting resin imprenated foamed polymeric resin article comprising the steps of:

1. impregnating a flexible open-cell foamed resin sheet with a liquid, heat-curable thermosetting resin,

2. applying a layer of at least one fibrous reinforcing material to both sides of said resin-impregnated foamed resin sheet, to form an assembly
3. lining at least a portion of the mold cavity of a closeable mold with said assembly of resin impregnated foamed resin sheet and reinforcing layers,
4. injecting a polyurethane foam-forming composition into said closeable mold and closing said mold,
5. permitting said foam-forming composition to expand in the closed mold thereby compressing said impregnated foam sheet and reinforcing layers so that the thermosetting resin is expelled from the foam sheet into the fibrous reinforcing layers to impregnate the reinforcing layers with resin throughout their thickness, and
6. allowing the resin in the sheet and layers to cure under said compression to form a unitary structure.

3,989,782
METHOD OF FORMING A SINTERED CERAMIC PRODUCT

Roland John Lumby, and Bernard North, both of Birmingham, England, assignors to Joseph Lucas Limited, Birmingham, England

Filed Dec. 23, 1974, Ser. No. 535,513
Claims priority, application United Kingdom, Dec. 29, 1973, 60144/73; June 20, 1974, 27331/74
Int. Cl.² C04B *33/32, 35/58*
U.S. Cl. 264—56 **16 Claims**

1. In a method of forming a sintered ceramic product wherein a mixture consisting essentially of an effective amount of aluminum nitride, silica, alumina and silicon nitride is provided and the relative proportions of said aluminum nitride, silica, alumina and silicon nitride are such that there is formed, after surrounding with a protective medium and sintering at a temperature between 1200°–2000° C, a ceramic material consisting of at least 95% by weight of a single phase compound obeying the formula

$$Si_{6-z}Al_zN_{8-z}O_z$$

where z is greater than zero and less than or equal to 5, the improvement being the step of introducing into said mixture at least two metal oxides, each being of a different metal, selected from the group consisting of magnesium oxide, a manganese oxide, lithium oxide, titanium dioxide, a boron oxide, and ferric oxide, wherein said at least two metal oxides react with part of the silica present in said mixture to form a silicate glass having a liquidus temperature below that of the silicate which would be formed from silica and either of the metal oxides alone, said glass aiding densification of the ceramic material.

2. In a method of forming a sintered ceramic product wherein a mixture consisting essentially of an effective amount of aluminum nitride, silica, and alumina is provided and the relative proportions of said aluminum nitride, silica and alumina are such that there is formed, after surrounding with a protective medium and sintering at a temperature between 1200°–2000° C, a ceramic material consisting of at least 95% by weight of a single phase compound obeying the formula:

$$Si_{6-z}Al_zN_{8-z}O_z$$

where z is greater than 4 and less than or equal to 5, the improvement being the step of introducing into said mixture at least two metal oxides, each being of a different metal, selected from the group consisting of magnesium oxide, a manganese oxide, lithium oxide, titanium dioxide, a boron oxide, and ferric oxide, wherein said at least two metal oxides react with part of the silica present in the mixture to form a silicate glass having a liquidus below that of a silicate which would be formed from silica with either of the metal oxides alone, said glass aiding densification of the ceramic material.

3,989,783
DENSE MULLITE CERAMIC BODIES AND PROCESS OF MANUFACTURE

Thomas D. McGee, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Continuation-in-part of Ser. No. 374,275, June 27, 1973, abandoned. This application June 2, 1975, Ser. No. 583,201
Int. Cl.² C04B *35/64, 35/10*
U.S. Cl. 264—56 **6 Claims**

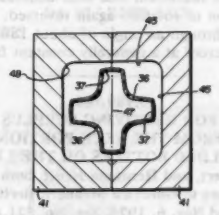
1. The process for converting a molecularly intermixed mixture of alumina (Al_2O_3) and silica (SiO_2) to dense mullite bodies, said mixture having been formed by precipitating a gel composed essentially of aluminum and silicon hydroxides in substantially stoichiometric proportions to form mullite ($Al_6Si_2O_{13}$), and dehydrating said gel to obtain said mixture, comprising:

a. having present in said mixture an amount of molecularly intermixed titania (TiO_2) of at least 0.25% but below 1.50% titania based on the weight of the mullite which can be formed therefrom;
b. calcining said mixture at a temperature within the range from 900° to 1150° C. to convert said mixture to mullite in intimate association with titania, said calcined mullite being in the form of frangible aggregates of titania crystals and mullite crystals having an average crystalline size as determined by line broadening X-Ray diffraction measurement of less than 1500 Angstroms;
c. grinding the calcined mixture until said aggregates are broken up and there is obtained a mixture of separated crystals of mullite and titania;
d. forming the ground mixture into the shape of the desired mullite bodies; and
e. heating said formed mullite bodies at an effective sintering temperature within the range from 1500° to 1700° C. to integrate said bodies, said heating at said effective sintering temperature being continued until said bodies have a density of at least 2.50 grams per cubic centimeter.

3,989,784
METHOD OF MAKING BLOW MOLDED PLASTIC ARTICLES

Albert R. Uhlig, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 402,888, Oct. 3, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 566,016
Int. Cl.² B29C *17/07*
U.S. Cl. 264—89 **11 Claims**



1. In a method of making a plastic article of non-circular cross-section having convex exterior portions from an essentially tubular parison, the steps of: (1) blowing the parison in a pre-form blow mold cavity into a pre-form in which the convex portions of the final bottle are defined by inverted concave pre-form portions which are hotter and thicker than the remainder of the pre-form (2) confining the pre-form in a final blow mold having a cavity conforming to the shape of the final article, and (3) inflating the pre-form in said cavity to (a) first conform the non-concave portions of the blown pre-form to a partial shape of the article, and (b) then to convert the concave portions of the pre-form to convex shapes

completing the article, the wall thickness of the final non-concave and convex portions being substantially the same.

3,989,785

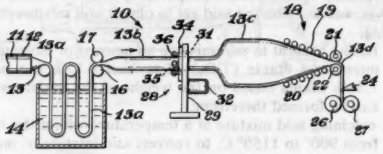
METHOD FOR THE PREPARATION OF PLASTIC FILM

William A. Bridge, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 308,501, Nov. 21, 1972, abandoned, which is a continuation of Ser. No. 56,502, July 20, 1970, abandoned. This application Nov. 25, 1974, Ser. No. 526,543

Int. Cl.² B29D *23/04*

U.S. Cl. 264—95 **2 Claims**



1. In a method for the preparation of extruded thermoplastic film wherein a tube of a synthetic thermoplastic resinous material is extruded from an annular die and inflated by means of a gas contained therein to provide a tube having a diameter generally commensurate with the diameter of the die from which it is extruded, the tube being subsequently enlarged without restriction to a desired diameter substantially greater than initial tube diameter by means of a trapped volume of gas therein, the enlarged tube being subsequently collapsed to a flattened form to provide a plastic film, the film subsequently wound onto a roll,

the improvement which comprises rotationally oscillating the tube relative to both the extruder and a collapsing means by frictionally engaging at least a portion of the periphery of the tube with a rotating means at a location between the die and prior to enlargement of the tube, the rotating means being positioned external to the tube, the rotating means consisting of a plurality of externally peripherally disposed rolls about the axis of the inflated tube, the rolls having their axes of rotation disposed in planes generally normal to the axis of the tube, with the further limitation that the rotating means has a variable speed drive and the rotating means is rotated in accordance with the following schedule: maximum speed decreasing to zero, direction of rotation reversed and speed increased to maximum and then decreased to zero and the direction of rotation again reversed; the tube being oscillated through an angle of about 180° or an integral multiple thereof at a generally constant frequency.

3,989,786

METHOD FOR REMOVING SURPLUS PLASTIC MATERIAL FROM THE NECK PORTIONS OF BLOW MOLDED BOTTLES OR THE LIKE

Gottfried Mehnert, and Hermann Reuel, both of Berlin, Germany, assignors to Gottfried Mehnert, Berlin, Germany

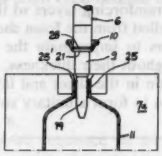
Filed Nov. 6, 1974, Ser. No. 521,420

Claims priority, application Germany, Nov. 3, 1973, 24155042; Mar. 30, 1974, 23551146

Int. Cl.² B29C *17/07, 17/12*

U.S. Cl. 264—98 **8 Claims**

1. A method of removing surplus material from the neck portions of bottles or analogous containers which are produced in the cavity of a partible blow mold in cooperation with an elongated blowing mandrel, comprising the steps of confining a deformable open-ended tubular parison section of synthetic thermoplastic material in the cavity of the mold so that the open end of the section constitutes the upper end thereof; introducing the mandrel into the open end of the confined section whereby the mandrel cooperates with the mold to press mold a first portion of the section which is adjacent to the open end with attendant formation of annular surplus material which surrounds the mandrel and is at least partially separated from the press molded portion; introducing through the mandrel a blowing fluid to expand the remaining portion of the confined section so that the latter is converted into a container having a neck portion which is constituted by said press molded portion; moving the mandrel lengthwise through a first distance, thereby only partially withdrawing the



mandrel from said mold to shift the surplus material away from the neck portion while retaining and end portion of the mandrel in the container; thereupon opening the mold to permit the container to descend by gravity while being guided by said end portion of said mandrel; and only subsequently moving the mandrel lengthwise through a second distance and simultaneously separating the surplus material from said mandrel.

3,989,787

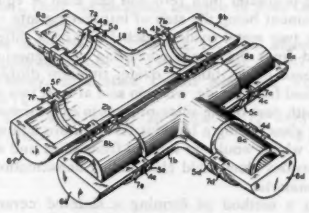
METHOD OF ROTATIONAL MOLDING A THERMOSETTING ARTICLE WITH A THERMOPLASTIC INSERT

John N. Scott, Jr., Dallas, Tex., and Guy E. Carrow, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 28, 1975, Ser. No. 599,738

Int. Cl.² B29C *5/08;* **B29D** *3/00, 23/08*

U.S. Cl. 264—114 **9 Claims**



1. A process for making a composite plastic article having a hollow body of crosslinked polymer material and at least one tube of thermoplastic polymer material bonded thereto, which process comprises:

a. introducing a particulate crosslinkable polymer into a rotational mold including a hot section and at least one cool section;

b. placing at least one tube of said thermoplastic polymer material into said mold in such a manner that:

aa. a portion of said tube is located inside of the hot section of said mold, and

bb. a remainder of said at least one tube is located in said cool section of said mold to avoid deformation of said tube during rotational molding;

c. heating and rotating said mold to fuse and cross-link said crosslinkable polymer during said rotating, and to form, a layer thereof on an inside surface of said mold and bonding said layer and said portion of thermoplastic polymer material, thereby forming said article;

d. cooling said mold and said polymer materials, and thereafter

e. removing said article from the mold.

3,989,788

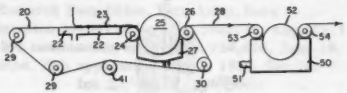
METHOD OF MAKING A BONDED NON-WOVEN WEB

Leland Lloyd Estes, Jr., Goodlettsville; Anton Fridrich Fridrichsen, Nashville, and Victor Simeon Koshkin, Hendersonville, all of Tenn., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 25, 1973, Ser. No. 354,506

Int. Cl.² D04H 1/54; B29F 5/00

U.S. Cl. 264—120 4 Claims



1. In a process for preparing a bonded nonwoven sheet wherein there is deposited on a moving belt a non-woven loose filamentary web of a mixture of about 70–95% by weight of polyethylene terephthalate matrix filaments and about 5–30% by weight of copolyester binder filaments, about 70–90% by weight of said copolyester comprising ethylene terephthalate repeating units and 10–30% by weight of the copolyester comprising ethylene isophthalate repeating units, the matrix filaments having a crystallinity index between 8 and 25%, the improvement comprising passing the deposited loose filamentary web under compressional restraint of about 0.2–2.0 lbs./in.² through saturated steam at practically atmospheric pressure for an exposure time of from 0.2 to 6 seconds to consolidate the web, removing the compressional restraint and forwarding the consolidated web to a bonding zone and finally heating the consolidated web in the bonding zone for an exposure time of from 0.2 to 6 seconds while the web is pressed against a porous surface with a flow of hot air through the web at a velocity of from 250 to 800 ft./min. and at a temperature of from 140° to 250° C.

3,989,789

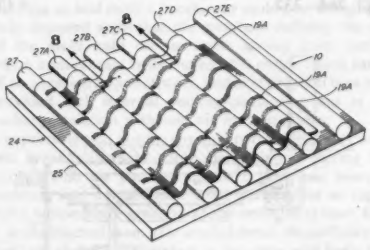
METHOD FOR MAKING A NON-RIGID LAMINAR CORE

Rex D. Brookhart, Mission Viejo, Calif., assignor to de Lorme Marketing Corporation, Mission Viejo, Calif.

Filed Mar. 3, 1975, Ser. No. 554,760

Int. Cl.² B29D 7/22

U.S. Cl. 264—136 5 Claims



1. A process for forming a three dimensional non-rigid core for laminar structures and comprising the steps of applying a heat curable but still liquified hardenable plastic stripe along a length of flexible cloth, applying at least one more plastic stripe along the length of the cloth substantially parallel to the first stripe, suspending the striped cloth on spaced supports such that the cloth intervenes between supports, curing the plastic coated areas, and then shaping the cured cloth with hardened stripes to a desired shape for a core.

3,989,790

METHOD FOR PREPARING SILICONE RUBBER MOLDS

Leonard Bretz Bruner, Manchester, Mich., and Kenneth Elmon Koch, Jr., Chelmsford, Mass., assignors to SWS Silicones Corporation, Adrian, Mich.

Filed Mar. 22, 1974, Ser. No. 453,759

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.² B29C 1/02

U.S. Cl. 264—225 11 Claims

1. A method for preparing a silicone mold having dimensional stability which comprises (1) applying to that portion of a stationary pattern which is vulnerable to high stress a room temperature curable silicone composition (a) having a 5 minute Williams plasticity value of from 60 to 140, said silicone composition (a) is prepared by forming a mixture containing a hydroxylterminated organopolysiloxane having a 30 second Williams plasticity value above about 100, sufficient filler to provide a 5 minute Williams plasticity value of from 60 to 140, a cross-linking agent and a catalyst capable of curing the silicone composition to an elastomeric solid at room temperature, (2) applying a room temperature curable silicone composition (b) which is compatible with silicone composition (a) and has a viscosity of from 5,000 to 80,000 cs. at 25°C. to the remainder of the pattern, said silicone composition (b) is prepared by forming a mixture containing a hydroxyl-terminated organoplysiloxane having a viscosity of from 100 to 40,000 cs. at 25°C., sufficient filler to provide a viscosity of from 5,000 to 80,000 cs. at 25°C., a cross-linking agent and a catalyst capable of curing the silicone composition to an elastomeric solid at room temperature, (3) curing the silicone compositions at ambient temperature and thereafter (4) removing the silicone mold from the pattern.

3,989,791

METHOD AND APPARATUS FOR MOULDING TIRES EMPLOYING PIVOTING TREAD FORMING SEGMENTS

Arthur David Tippin, Tamworth, England, assignor to Dunlop Limited, Birmingham, England

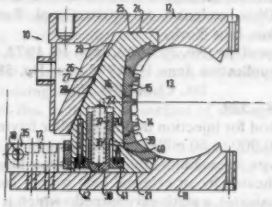
Filed July 2, 1974, Ser. No. 485,169

Claims priority, application United Kingdom, July 12, 1973, 33223/73

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² B29H 5/02

U.S. Cl. 264—315 5 Claims



1. A method of moulding a tire which comprises locating on a first mould part a tire or tire carcass of bowed configuration in radial section such that the beads are wider apart than any other parts of the tire, inflating a diaphragm to enter the tire or carcass, moving a second mould part relative to the first part to close the mold and to deform the tire or carcass generally to C-shape in radial section and provide a circular mould cavity enclosing the tire or carcass, and simultaneously with

closure of the mould, jointly angularly moving by means of the second mould part a plurality of segments adapted to form a tread on the tire or carcass whereby the segments pivot about respective pivot axes all lying in a plane to which the axis of the mould cavity is perpendicular and are therefore displaced by the second mould part both axially and inwardly of the mould cavity to final molding position, said axial displacement of said segments being generally coincident with axial displacement of the tread portion of the tire or carcass during said deformation thereof.

2. A tire mould comprising upper and lower mould parts, the upper mould part being arranged to be raised and lowered to open and close the mould and in its closed position defining with the lower mould part a circular, tire forming cavity, a plurality of tread forming segments pivotable relative to the lower mould part about individual axes all lying in a plane perpendicular to the axis of the cavity of the closed mould between a final molding position in which the segments are arranged to engage the circumference of a tire or tire carcass inserted in the cavity and an inoperative position spaced radially outwardly of the cavity from the final molding position, each segment moving in an arcuate path about the respective axis thereof and therefore both radially and axially of the cavity, the upper mould part having a cam surface which co-operates with cam surfaces of the segments as the mould is closed whereby the segments are jointly displaced in said arcuate paths from their inoperative position to their final molding position by the upper mould part as the latter moves to the closed position.

3,989,792

METHOD FOR FABRICATING A CONSUMABLE CARTRIDGE CASING

Anthony San Miguel, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 1, 1974, Ser. No. 457,001
Int. Cl.² F42B 9/16, 5/30
U.S. Cl. 264—325 **3 Claims**

1. A method for fabricating a consumable cartridge comprising the steps of:

a. mixing from 85 to 50 weight percent polysulfone powder with from 15 to 50 weight percent of a powdered oxidizer;

b. placing the mixed powders in a suitably shaped mold; and

c. pressing the mixed powders under a pressure in the range of from 100,000 to 150,000 psi for from 1 minute to 1 hour.

3,989,793

INJECTION MOLDING OF RUBBER COMPOUNDS

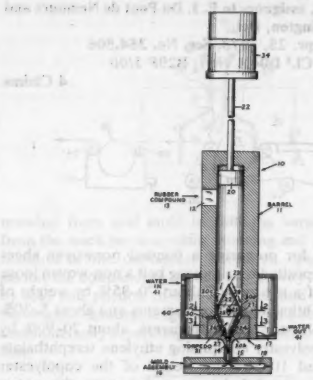
Douglas L. Hertel, Strongsville, and Sidney E. Rains, Medina, both of Ohio, assignors to International Basic Economy Corporation, New York, N.Y.

Continuation of Ser. No. 395,629, Sept. 10, 1973, abandoned. This application June 18, 1975, Ser. No. 587,972
Int. Cl.² B29H 3/08
U.S. Cl. 264—329 **11 Claims**

1. A method for injection molding rubber having a viscosity of about 500,000 to 50 million poises at ambient temperature in a ram type injection molding apparatus having a barrel which is unheated by an external heat source and in which a piston reciprocates, a stationary torpedo which is unheated by any external heat source and which is located in the end of the barrel downstream of the piston to form an annular channel between the torpedo and barrel wall, and a mold cavity operatively connected to the barrel downstream of the annular channel, said method comprising the steps of:

conducting the rubber to the torpedo at substantially ambient temperature and with a viscosity of about 500,000 to 50 million poises by operation of the piston;

passing the rubber around the torpedo and through the annular channel between the torpedo and barrel wall by operation of the piston to form an annular film of the rubber and to shear the rubber in the channel and thereby substantially decrease its viscosity and autogenously heat the rubber to a temperature above the critical scorch temperature to produce a heated, flowable rubber having a substantially uniform temperature throughout and initiate vulcanization of the rubber while still in the barrel, the heating of the rubber resulting substantially solely from



the shearing of the rubber in the annular channel and without supplying heat to the rubber as it passes through the annular channel by conduction from any external heat source;

injecting the heated, flowable rubber exiting from the annular channel into the mold cavity substantially prior to completion of vulcanization of the rubber; and

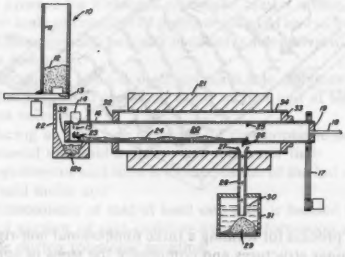
completing vulcanization of the rubber in the mold cavity.

3,989,794

PROCESS OF MANUFACTURING FERRITE BODIES OF LOW POROSITY

Jean Berchtold, La Jolla, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 104,563, Jan. 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 103,480, Jan. 4, 1971, abandoned. This application May 18, 1973, Ser. No. 361,698
The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.
Int. Cl.² C04B 35/60, 35/26
U.S. Cl. 264—332 **9 Claims**



9. In a process for preparing a ferromagnetic ferrite in which a ferrite powder is formed and subsequently hot pressed, the improvement which comprises (1) controlling the oxygen pressure or partial pressure thereof in the ambient

atmosphere during said formation of said ferrite powder so as to yield a ferrite powder which has a substantially stoichiometric oxygen content, (2) quenching said powder in water and (3) controlling the oxygen pressure or partial pressure thereof in the ambient atmosphere through said hot pressed to maintain said substantially stoichiometric oxygen content of said ferrite powder while simultaneously exerting mechanical pressure of about 5 to about 500 kg. per square centimeter on said ferrite powder.

3,989,795

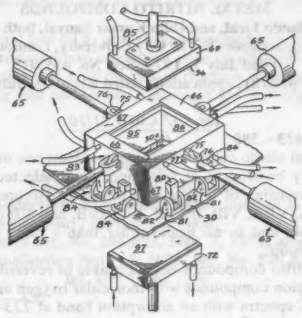
METHOD OF COMPRESSING CERAMIC REFRACTORY BODIES

Thomas D. McGee, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Continuation-in-part of Ser. No. 388,178, Aug. 13, 1973, which is a continuation of Ser. No. 154,414, June 18, 1971, abandoned. This application May 1, 1975, Ser. No. 573,748

Int. Cl.² B28B *7/00, 3/02*

U.S. Cl. 264—334 **5 Claims**



1. The method of compressing a formed porous body of ceramic refractory material to decrease its porosity and increase its strength, said compressing being carried out in a mold having inwardly movable wall means to exert the compressing force on the body, said porous ceramic body being at a pyroplastic temperature in the range of about 1100° to 1500° C. during said compressing, wherein the improvement comprises:

a. utilizing as said mold a breakaway mold providing oppositely-disposed separable die members defining the walls of the mold, said die members having inner surfaces which contact said body during said compression formed of an abrasion resistant steel, and said die members being provided with internal cooling passage means in heat exchange relation with said die inner surfaces;

b. compressing said porous ceramic pyroplastic body within said breakaway mold while circulating a cooling fluid through said die passage means to cool said inner die surfaces, said compression being carried out so rapidly that a temperature gradient of the order of at least 1000° C. is maintained from said cooled inner die surfaces to a depth of about 5 millimeters or less into said body from the die-contacted outer surfaces thereof, whereby a thin porous skin is formed around said body which is limited in thickness to said depth; and

c. releasing the pressure on said body and opening said mold by separating said oppositely-disposed die members in directions perpendicular to the respective contacted sides of said body so as to limit sliding friction between said body and said mold as it is released therefrom.

3,989,796

METHOD FOR REMOVING SULFUR DIOXIDE IN THE FORM OF CALCIUM SULFITE FROM COMBUSTION EXHAUST GAS

Tomijiro Morita; Isao Funahashi; Koichi Igarashi, and Masakazu Takaiwa, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 18, 1973, Ser. No. 398,426

Claims priority, application Japan, Sept. 19, 1972, 47-93933

Int. Cl.² C01B *17/00*

U.S. Cl. 423—242 **7 Claims**

1. In a method for removing sulfur dioxide from a combustion exhaust gas in the form of calcium sulfite wherein said combustion exhaust gas is contacted with an aqueous alkali sulfite solution to form an aqueous alkali bisulfite solution, to which is then added calcium carbonate slurry to form calcium sulfite, and the calcium sulfite is separated from the reaction solution, the improvement comprising the calcium carbonate slurry is prepared by wet-powdering calcium carbonate in a particle size within a range of 0.1 – 30 μ by the use of a part of a filtrate of the reaction solution, and reusing the remaining part of the filtrate by recirculation as the aqueous alkali sulfite solution.

3,989,797

PROCESS FOR REMOVING SULFUR OXIDES FROM GAS STREAMS

Jack D. Brady, and Lester K. Legatski, both of Wheaton, Ill., assignors to FMC Corporation, New York, N.Y.

Filed Mar. 15, 1974, Ser. No. 451,643

Int. Cl.² C01B *17/00*

U.S. Cl. 423—242 **5 Claims**

1. In a process for removing gaseous sulfur oxides from a gas stream by means of a circulating aqueous acidic extracting solution which contains sodium sulfate, sodium sulfite, and sodium bisulfite wherein said gas stream is contacted with the circulating extracting solution to form a liquid extract having an increased sodium bisulfite content, wherein at least a portion of the sodium bisulfite content of said extract is regenerated to sodium sulfite by the addition of calcium hydroxide so as to form an aqueous acidic slurry containing dissolved sodium sulfite and calcium sulfite, wherein the solid calcium sulfite is separated from said solution so as to produce a regenerated aqueous solution having a reduced bisulfite content, and wherein the regenerated aqueous solution is commingled with the circulating extracting solution, the improvement comprising:

withdrawing a portion of said extract from circulation and forming an agitated liquid column which includes said withdrawn portion and comprises an aqueous solution of sodium bisulfite, sodium sulfite, and sodium sulfate, said column having ascending zones of decreasing turbulence;

introducing calcium hydroxide into said aqueous solution so as to maintain the pH of the agitated liquid column at a value of at least about 7.9 to about 9.5 and to produce a floc containing calcium sulfite;

floating said floc to the upper surface of said agitated liquid column;

removing said floc as an overflow from said liquid column and transporting said floc substantially intact to a thickening zone;

permitting said floc to settle by gravity in said thickening zone so as to produce a thickened slurry containing solid calcium sulfite;

withdrawing a first aqueous solution having a reduced sodium bisulfite content as overflow from the thickening zone;

collecting said thickened slurry from the thickening zone as underflow;

filtering said thickened slurry and recovering as filtrate a second aqueous solution having a reduced sodium bisulfite content; and

combining said first and second aqueous solutions having a reduced sodium bisulfite content to produce said regenerated aqueous solution.

3,989,798

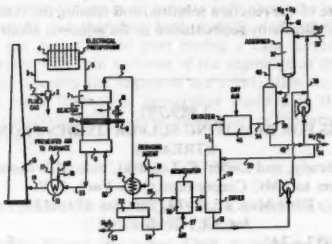
REGENERATING FLUE GAS DESULFURIZATION CATALYSTS WITH REDUCING GAS

David F. Greene, Westfield; Robert J. Lang, Watchung, and Albert B. Welty, Jr., Westfield, all of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 800,104, Feb. 18, 1969, abandoned. This application July 23, 1973, Ser. No. 381,369

Int. Cl.[2] B01J *8/00*; C01B *17/00*

U.S. Cl. 423—244 **5 Claims**



1. A process for the removal of SO_2 from a flue gas stream containing such flue gas and the production of a concentrated stream of SO_2, said process comprising the steps of passing the flue gas at a temperature in the range of about 600° to 900° F. into contact with an absorbent-catalyst material comprising vanadium oxide supported on an inorganic oxide carrier whereby SO_2 is absorbed from the flue gas and a stream of flue gas relatively free of SO_2 is obtained and then in a separate cycle, contacting the absorbent-catalyst material containing absorbed SO_2 with a reducing desorption agent at a temperature in the range of about 800° to 900° F. whereby SO_2 is desorbed from the absorbent-catalyst into the desorption gas stream.

3,989,799

DIVALENT METAL SALTS OF DODECAMETAL TRIACONTA CARBONYLS

Earle S. Brown, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 27, 1974, Ser. No. 455,379

Int. Cl.[2] C01F *13/00*; C01G *1/04*

U.S. Cl. 423—249 **28 Claims**

1. Mixed metal triaconta carbonyl salts of the formula:

$$M[T_xT'_{12-x}(CO)_{30}]$$

wherein M is a divalent metal cation selected from the group consisting of beryllium, magnesium, calcium, strontium, radium, manganese, iron, ruthenium, cobalt, nickel, palladium, platinum, zinc, cadmium, mercury, cerium and europium, T and T′ are each different metals selected from the group consisting of cobalt, iridium and rhodium, and *y* may be any whole number between 1 and 11.

3,989,800

ALKALI METAL GOLD CYANIDE METHOD

Grant N. Gansinger, Phoenix, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 427,747, Dec. 26, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,694

Int. Cl.[2] C01C *3/11*

U.S. Cl. 423—364 **5 Claims**

1. A method for converting finely divided gold particles into an aqueous electroplating solution of pure alkali metal gold cyanide which comprises:

reacting said gold particles with hydrogen peroxide and alkali metal cyanide to provide a reaction mixture comprising alkali metal gold cyanide and soluble inorganic by-products;

acidifying said reaction mixture with a mineral acid to provide insoluble gold cyanide;

removing said soluble gold cyanide from the reaction mixture; and

reacting said insoluble gold cyanide with alkali metal cyanide to produce alkali metal gold cyanide.

3,989,801

METAL NITRITO COMPOUNDS

Brian Orlando Field, and Dilip Kumar Sanyal, both of London, England, assignors to The City University, London, England

Filed July 1, 1974, Ser. No. 485,015

Claims priority, application United Kingdom, July 10, 1973, 32866/73

Int. Cl.[2] C01B *21/20*

U.S. Cl. 423—385 **13 Claims**

1. Metal nitrito compounds having at least one nitrito group covalently bonded to at least one metal selected from the group consisting of lithium and metals of Groups IIA, IVA, VA, VIA, VIIA, VIII, IB, IIB, IIIB, IVB, and VB of the Periodic Table and to no ligand other than a nitro group or a nitrato group,

said nitrito compounds being capable of reversibly forming addition compounds with molecular oxygen and having a U.V. spectra with an absorption band at 223–235 mμ.

3,989,802

TREATMENT OF CARBON FIBERS

Louis A. Joo; Roger Prescott; Gordon E. Sharpe, and Frank E. Snodgrass, all of Johnson City, Tenn., assignors to Great Lakes Carbon Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 10,639, Feb. 11, 1970, abandoned. This application Mar. 21, 1973, Ser. No. 343,587

Int. Cl.[2] C01B *31/07*

U.S. Cl. 423—447.1 **1 Claim**

1. A method of treating high modulus acrylic-based carbon fibers which comprises contacting the fiber with an aqueous solution containing about 15 to about 35 percent by weight of sulfuric acid and about 7 to about 14 percent by weight of sodium dichromate or an equivalent thereof of a chromic acid producing salt at the refluxing temperature of the solution at normal sea level atmospheric pressure for about 1 to about 60 minutes.

3,989,803

CONCENTRATION OF CARBONACEOUS SOLIDS IN FUEL OIL STREAM IN A CARBON BLACK PROCUS

Eulas W. Henderson, Oregon, Ohio, assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed June 23, 1975, Ser. No. 589,318

Int. Cl.[2] C09C *1/50*

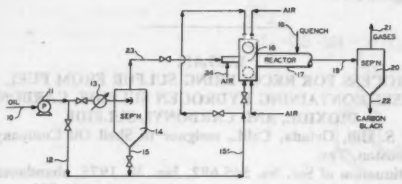
U.S. Cl. 423—450 **6 Claims**

1. A process for producing carbon black having a low grit content comprising in combination:

passing a first stream of hydrocarbon oil containing carbonaceous solid contaminants to a separation zone and therein dividing said first stream into a second stream

having a portion of said carbonaceous solids removed therefrom and a third stream containing said thus-removed carbonaceous solids;

passing said second stream to a carbon black reactor as feed oil;



passing said third stream to said carbon black reactor as fuel oil;

burning said fuel oil to provide hot combustion gases which are introduced into a reaction zone of said reactor;

decomposing said feed oil in said reaction zone; and

recovering said carbon black having a low grit content.

3,989,804

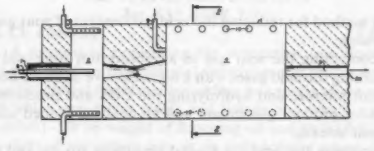
CARBON BLACK METHOD

John W. Vanderveen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 286,893, Sept. 7, 1972, abandoned. This application Nov. 18, 1974, Ser. No. 524,832

Int. Cl.² C09C *1/50*

U.S. Cl. 423—457 **3 Claims**



1. A process for producing carbon black comprising:

a. introducing reactant materials comprising hydrocarbon feed and fuel gas axially into a first section of a carbon black reactor with an oxidant introduced in radial flow to produce a first reactant mass;

b. passing said reactants through a mixing zone producing a nonrotating first reactant mass flowing longitudinally in the reactor;

c. passing the non-rotating reactant mass into a second section of the carbon black reactor with addition of a tangential flow of air and an axial flow of fuel gas to produce a total reaction mass comprising a non-rotating reactant mass flowing longitudinally in the reactor surrounded by a helically flowing mass of hot combustion gases;

d. passing the total reactant mass into a pyrolytic reaction section to produce carbon black; and

e. recovering the carbon black produced.

3,989,805

PROCESS FOR THE PRODUCTION OF ALUMINUM CHLOROHYDROXIDES HAVING A CONTROLLED CHLORINE CONTENT

Bruno Notari, and Luigi Rivola, both of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., San Donato Milanese, Italy

Filed Feb. 28, 1973, Ser. No. 336,754

Claims priority, application Italy, Mar. 1, 1972, 21251/72

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² C01F *7/00, 7/48, 7/56*; C01C *1/16*

U.S. Cl. 423—462 **1 Claim**

1. The process for preparing, as end product, aluminum chlorohydroxide represented by the formula, $Al_2(OH)_5Cl$, which consists in reacting an aluminum compound having a particle diameter of 500–4000A selected from the group consisting of bayerite, gibbsite, diaspore and boehmite with 37% hydrochloric acid in aqueous solution at a temperature of 110°–150°C in the presence of an inert gas atmosphere of from 0.8 to 1.5 kg/cm² and under strong mechanical stirring of the reactants for a period of 4 hours to form aluminum chlorohydroxide represented by the formula, $Al_2(OH)_xCl_y$ wherein the values of x and y range from 2.5 to 3.5 and from 3.5 to 2.5 respectively, then neutralizing said aluminum chlorohydroxide with aqueous or gaseous anhydrous ammonia to establish a pH in the solution in the range between 2.7 and 3.1 at a temperature of 65°–75°C under strong mechanical stirring conditions to prevent the precipitation of alumina gel and then separating ammonium chloride by crystallization in the form of macrocrystals having dendrite branching and thereafter recovering said aluminum chlorohydroxide.

3,989,806

LOW TEMPERATURE CATALYTIC OXIDATION OF CHLORINATED ORGANIC COMPOUNDS TO RECOVER CHLORINE VALUES

David E. Hyatt, Golden, Colo., assignor to Vulcan Materials Company, Birmingham, Ala.

Filed Feb. 10, 1975, Ser. No. 548,769

Int. Cl.² C01B *7/02*

U.S. Cl. 423—502 **20 Claims**

1. A catalytic oxidation process for the recovery of chlorine from chlorocarbon compounds consisting of carbon and chlorine, which process consists essentially of catalytically oxidizing a feed consisting essentially of chlorocarbon compounds by reacting the feed with at least a stoichiometric amount of oxygen present in the process as molecular oxygen or molecular oxygen-containing gas at a reaction temperature of below about 500° C, in the presence of at least one transition metal-containing supported catalyst for a time sufficient to recover substantially all of the chlorine from the chlorocarbon compound feed.

3,989,807

LOW TEMPERATURE CATALYTIC OXIDATION OF CHLORINATED COMPOUNDS TO RECOVER CHLORINE VALUES USING CHROMIUM-IMPREGNATED SUPPORTED CATALYSTS

Earnest L. Johnston, Clearwater, Kans., assignor to Vulcan Materials Company, Birmingham, Ala.

Filed Feb. 10, 1975, Ser. No. 548,776

Int. Cl.² C01B *7/02*

U.S. Cl. 423—502 **16 Claims**

1. An improved catalytic oxidation process for the recovery of chlorine from chlorocarbons consisting of carbon and chlorine, which process consists essentially of catalytically oxidizing a feed consisting essentially of chlorocarbons with at least a stoichiometric amount of oxygen present in the process as molecular oxygen or molecular oxygen-containing gas at a reaction temperature of below 500° C in the presence of at least one supported catalyst selected from the group consisting of salts and oxides of chromium impregnated on a support

for a time sufficient to recover substantially all of the chlorine from the chlorocarbon feed.

3,989,808

METHOD OF PREPARING PURE FLUORINE GAS

Larned B. Asprey, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 28, 1975, Ser. No. 599,443
Int. Cl.² C01B 7/20
U.S. Cl. 423—503 1 Claim

1. An improved method of preparing 99.9+% pure fluorine comprising the steps of:

a. grinding a 3:1 mole ratio mixture of KF to NiF_2 to form an absorbent mixture and filling a nickel can container with said mixture;

b. adding impure fluorine at superatmospheric pressure up to 10 atmospheres while slowly heating up to 500° C at which temperature the fluorine is rapidly absorbed to form nickel fluoride complex salts and thereafter lowering the container temperature to 250° C while additional impure fluorine is added to maintain a several atmosphere pressure;

c. repeating at least twice the heating and cooling cycles of step (b);

d. after the absorption of the elemental fluorine stops, the temperature is lowered to 225° C and the system evacuated to remove the concentrated impurities from the impure fluorine;

e. after the step of evacuation, the system is then heated to approximately 400° C, whereupon the pressure is of the order of 20 atmospheres, to cause the nickel fluoride complex salts to decompose and evolve pure fluorine gas.

3,989,809

PROCESS FOR THE RECOVERY OF SULFUR

Adolf Stauffer, Pulheim, Germany, assignor to Davy Powergas GmbH, Germany

Filed June 28, 1974, Ser. No. 484,265
Claims priority, application Germany, June 28, 1973, 2332886
Int. Cl.² C01B 17/00
U.S. Cl. 423—567 A 15 Claims

1. A method for recovering elemental sulfur from an ammonium salt of a sulfuric oxyacid, comprising reacting said salt and a hydrogenous reducing agent in a reaction chamber which is maintained at reducing conditions including a temperature between 800° and 1300° C. so as to yield a product gas consisting essentially of molecular nitrogen, steam and vaporous sulfur in an amount which is 50 to 90% of the sulfur contained in said ammonium salt, discharging said product gas from the reaction chamber, cooling the product gas to a temperature of 125° to 325° C. so as to condense at least 50% of the sulfur to molten elemental sulfur, and separating said molten elemental sulfur from the uncondensed gas.

3,989,810

HYDROGEN SULFIDE REMOVAL

Akira Toyama, Kobe, and Koji Ishizaki, Akashi, both of Japan, assignors to Kobe Steel Ltd., Japan

Continuation of Ser. No. 145,067, May 19, 1971, which is a continuation-in-part of Ser. No. 774,492, Nov. 8, 1968, abandoned. This application Feb. 24, 1975, Ser. No. 552,763
Claims priority, application Japan, Nov. 16, 1967, 42-74034; Nov. 16, 1967, 42-74035
Int. Cl.² C01B 17/04
U.S. Cl. 423—573 R 13 Claims

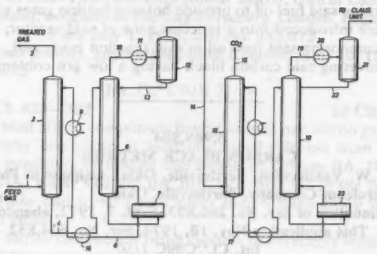
12. A process for the removal of hydrogen sulfide from gaseous or liquid material containing hydrogen sulfide and conversion of the hydrogen sulfide to sulfur which comprises (a) contacting the gaseous or liquid material at a temperature between 0° and 100° C with an alkaline solution of a nitrated lignin derivative (1) being the product obtained by treating a lignin with a nitrating agent selected from the group consisting of nitric acid, fuming nitric acid, mixed acids and nitrogen oxides at a temperature from 0° to 200° C for 0.5 to 80 hours and (2) containing from 3 to 8% nitrogen as nitro groups and having a neutralization equivalent of more than 80, and (b) passing air through the solution whereby the lignin derivative is regenerated.

3,989,811

PROCESS FOR RECOVERING SULFUR FROM FUEL GASES CONTAINING HYDROGEN SULFIDE, CARBON DIOXIDE, AND CARBONYL SULFIDE

Earl S. Hill, Orinda, Calif., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 545,692, Jan. 30, 1975, abandoned. This application Nov. 10, 1975, Ser. No. 630,580
Int. Cl.² C01B 17/04; B01D 53/14
U.S. Cl. 423—573 G 12 Claims



1. A method for reducing the acid gas content of sour gases, comprising:

A. contacting the sour gas in an absorption zone and absorbing the acid gases with a non-selective aqueous absorbent mixture and hydrolyzing the COS and producing a sweet product gas stream and an acid gas-loaded absorbent stream;

B. stripping the acid gas-loaded absorbent stream and producing an acid gas stream containing principally H_2S and CO_2;

C. selectively absorbing H_2S from the acid gas stream to produce a CO_2 containing stream and an H_2S-rich absorbent;

D. regenerating the H_2S-rich absorbent to produce an acid gas stream containing H_2S;

E. recovering the H_2S in the acid gas stream as elemental sulfur by oxidation of the H_2S with an oxygen containing gas.

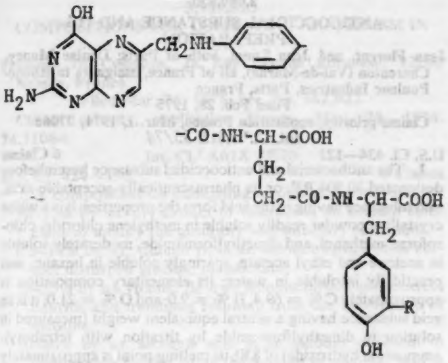
3,989,812

FOLIC ACID DERIVATIVES AND USE IN RADIO-ASSAY

M. James Barrett, Saratoga, and Joseph I. De Graw, Sunnyvale, both of Calif., assignors to SmithKline Instruments, Inc., Palo Alto, Calif.

Filed Aug. 9, 1974, Ser. No. 495,982
Int. Cl.² A61K 43/00; C07C 103/52; A61N 5/12
U.S. Cl. 424—1 4 Claims

1. A chemical compound of the formula:



wherein R is radioactive iodine: I^{125} or I^{131}.

3. In a radioassay material for radioassaying a specimen for folic acid, its metabolites or derivatives which bind to β-lactoglobin, the improvement which comprises employing therein a chemical compound of claim 1.

3,989,813

STABILIZED DENTIFRICE

Joseph Paul Januszewski, Somerville, N.J.; Tayseer George Bahouth, deceased, late of Piscataway, N.J., and by Zaher G. Bahouth, administrator, Utica, N.Y., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 326,810, Jan. 26, 1973, abandoned, which is a continuation of Ser. No. 126,971, March 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 818,084, April 21, 1969, Pat. No. 3,641,238. This application Oct. 9, 1975, Ser. No. 621,179

Int. Cl.² A61K 7/22

U.S. Cl. 424—54 5 Claims

1. A process of preventing the separation into liquid and solid phases of an antibacterial dentifrice comprising forming the antibacterial dentifrice by adding to a single phase vehicle mass which comprises solids and liquids and which contains about 0.01–5% by weight of flavoring oil and about 0.015–2% by weight of phosphate ion, as an antibacterial agent, 1,6-di-(p-chlorophenyl biguanido) hexane, in amount to provide about 0.01–5% by weight of the free base and about 2.5–10% by weight of ethanol to prevent phase separation.

3,989,814

CALCIUM PYROPHOSPHATE ABRASIVE SYSTEM FOR DENTIFRICE

Martin Cordon, Highland Park, and James Norfleet, Plainfield, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 544,618, Jan. 28, 1975. This application Mar. 17, 1975, Ser. No. 559,117

Int. Cl.² A61K 7/16

U.S. Cl. 424—57 7 Claims

1. A dentifrice having superior cleaning and polishing characteristics containing an abrasive system including calcium pyrophosphate, which calcium pyrophosphate has been pretreated with a non-toxic zinc compound in an amount to provide at least about 0.0065% by weight of zinc to the dentifrice, the amount of said zinc compound being up to about 1% by weight, to reduce the enamel abrasivity.

3,989,815

NOVEL N-BIS-AZACYCLOPENTAN-2-ONYL ALKANES

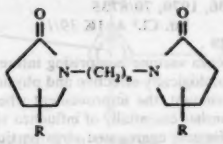
Vithal Jagannath Rajadhyaksha, Mission Viejo, Calif., assignor to Nelson Research & Development Company, Irvine, Calif.

Filed June 19, 1975, Ser. No. 588,248

Int. Cl.² A61K 7/44, 31/40

U.S. Cl. 424—60 11 Claims

1. A method for enhancing the penetration of physiologically active agents through human and animal body skin and membranes comprising administering to a human or animal a composition comprising an effective amount of said agent and a non-toxic, effective membrane penetrating amount of a compound having the formula



wherein R is selected from the group consisting of H and alkyl having 1–4 carbon atoms and *n* is a positive integer from 1–18.

3,989,816

VEHICLE COMPOSITION CONTAINING 1-SUBSTITUTED AZACYCLOHEPTAN-2-ONES

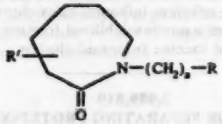
Vithal Jagannath Rajadhyaksha, Mission Viejo, Calif., assignor to Nelson Research & Development Company, Irvine, Calif.

Filed June 19, 1975, Ser. No. 588,247

Int. Cl.² A61K 7/44, 31/33

U.S. Cl. 424—60 11 Claims

1. A method for enhancing the penetration of physiologically active agents through human and animal body skin and membranes comprising administering to a human or animal a composition comprising an effective amount of said agent and a non-toxic, effective membrane penetrating amount of a compound having the formula



wherein R′ is selected from the group consisting of H and alkyl having 1–4 carbon atoms, R is selected from the group consisting of an alkyl of 1–18 carbon atoms and phenyl and *n* is 0 or a positive integer from 1–10.

3,989,817

PREPARATION FOR HARDENING ANIMAL FINGER AND TOENAIL TISSUE AND METHOD

Frederick S. Mayer, 1053 Lea Drive, San Rafael, Calif. 94903

Continuation-in-part of Ser. No. 816,080, April 14, 1969, abandoned. This application Apr. 14, 1972, Ser. No. 244,246

Int. Cl.² A61K 7/043

U.S. Cl. 424—61 4 Claims

1. The composition suitable for use for the hardening of keratinous animal finger or toenail tissue consisting essentially of a mixture of walnut oil, water and a neutral oleaginous carrier wherein in parts by volume for each 100 parts of the

mixture there is present an amount of walnut oil in the range from 10 to 50 parts, an amount of water in the range 25 to 45 parts and an amount of the carrier in the range 25 to 45 parts, said carrier being selected from the group consisting of mineral oil, paraffinic hydrocarbon mixtures, C_6–C_{20}-alkanols, saponified wool fat, and mixtures thereof.

3,989,818

INFLUENZA VIRUS VACCINE

Alfred Polson, Milnerton, South Africa, assignor to South African Inventions Development Corporation, Pretoria, South Africa

Continuation of Ser. No. 170,478, Aug. 10, 1971, abandoned. This application Oct. 4, 1974, Ser. No. 512,223

Claims priority, application South Africa, Aug. 14, 1970, 70/5633; Dec. 30, 1970, 70/8735

Int. Cl.² A61K *39/18*

U.S. Cl. 424—89 **6 Claims**

1. In an influenza vaccine comprising influenza virus particles in an immunologically effective and physiologically tolerated form and amount, the improvement wherein said influenza vaccine consists essentially of influenza virus particles in the form of intimately aggregated virus particles interlocked as strong, coherent clusters distinguishable from spontaneous loose viral aggregations by:

a. not being dispersable to the monomeric virus state without causing disruption of the individual virus particles, such that the individual virus particles in said clusters can be disrupted to release nucleic acids therefrom while essentially retaining the coherent cluster state;

b. said clusters exhibiting a reduced hemaglutinin content in comparison with the same amount of monomeric virus particles; and

c. said clusters being capable of preparation from an aqueous dispersion of monomeric influenza virus particles having a pH of 6–9 and containing more than 600 HA units of virus particles per ml., only HA units ascribable to actual influenza virus particles being taken into account, by

i. precipitating said virus from said aqueous dispersion at a temperature not exceeding 35° C. by adding 3–4% by weight polyethylene glycol having a molecular weight of about 6,000–7,000 thereto;

ii. separating an insolubilized fraction consisting essentially of said strong, coherent influenza virus clusters by phase separation from a non-insolubilized fraction; and

iii. preparing said vaccine from said clusters.

3,989,819

PROCESS FOR SEPARATING PROTEINS FROM CENTRAL NERVOUS SYSTEM TISSUE AND TREATING EXPERIMENTALLY INDUCED DEMYELINATING DISEASES

John A. Brockman, Woodcliff Lake, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 804,494, March 5, 1969, abandoned. This application Oct. 26, 1971, Ser. No. 191,982

Int. Cl.² A61K *35/12, 35/56*

U.S. Cl. 424—95 **11 Claims**

1. A process for separating components with weight average molecular weights of approximately 2,000 to 4,000 having weak encephalitogenic activity and high protective activity from the crude basic protein derived from defatted myelinated mammalian central nervous system material, which comprises dissolving said mammalian central nervous system material in a solution of about 0.005M to about 0.015M sodium carbonate in about 0.01M to about 0.09M ammonium hydroxide, chromatographing said solution containing mammalian central nervous system material on carboxymethylcellulose having sodium cations, eluting said chromatographed solution with approximately 0.01M to 0.03M of sodium chloride in approximately 0.01M to 0.09M ammonium hydroxide solution, collecting said eluate and recovering said components from said eluate.

3,989,820

ANTICOCCIDIAL SUBSTANCE AND ITS PREPARATION

Jean Florent, and Jean Lunel, both of Paris; Denise Mancy, Charenton (Val-de-Marne), all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Feb. 28, 1975

Claims priority, application France, Mar. 1, 1974, 07066

Int. Cl.² A61K *35/74*

U.S. Cl. 424—122 **6 Claims**

1. The antibacterial and anticoccidial substance hereinbefore designated 30,504 RP, or its pharmaceutically-acceptable salts, said substance having in the acid form the properties: it is a white crystalline powder readily soluble in methylene chloride, chloroform, methanol, and dimethylformamide, moderately soluble in acetone and ethyl acetate, sparingly soluble in hexane, and practically insoluble in water; its elementary composition is approximately C % = 69.4; H % = 9.0; and O % = 21.0; it is an acid substance having a neutral equivalent weight (measured in solution in dimethylformamide by titration with tetrabutylammonium hydroxide) of 830; its melting point is approximately 200° C. (measured on a Kofler bench), and its optical rotation (measured at a concentration of 1% in methanol) is approximately: $[\alpha]_D^{20} = -79°$; $[\alpha]_{436}^{20} = -188°$; and $[\alpha]_{365}^{20} = -378°$; its ultra-violet spectrum does not show any characteristic absorption; and its infra-red spectrum (determined on tablets of a mixture with potassium bromide) shows the following characteristic absorption bands expressed in wave numbers: 3440 S, 3030 sh, 2960 S, 2938 S, 2880 S, 2855 sh, 2640 vw, 2060 vw, 1945 vw, 1900 vw, 1785 sh, 1705 S, 1632 m, 1622 sh, 1535 vw, 1458 S, 1405 sh, 1380 S, 1325 m, 1315 sh, 1295 sh, 1272 m, 1225 w, 1200 vw, 1172 m, 1140 m, 1115 sh, 1100 sh, 1085 S, 1070 sh, 1045 sh, 1038 S, 1012 m, 980 S, 958 S, 935 m, 915 m, 880 w, 865 vw, 845 vw, 825 w, 792 m, 775 w, 735 w, 700 w, 675 sh, 655 w, 630 sh, 615 m, 565 sh, 525 m, 495 m, 465 vw, 445 w $cm.^{-1}$; in ascending chromatography on a thin layer of silica gel using, as solvent, a mixture of ethyl acetate, cyclohexane, water and butanol (50/50/25/5 by volume) it has an Rf of 0.45, and using a mixture of methylene chloride and methanol (94/6 by volume) it has an Rf of 0.55.

3,989,821

POLYPEPTIDES

Harold Gregory, and Peter Leslie Walton, both of Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 420,573, Nov. 30, 1973, Pat. No. 3,903,069. This application Apr. 30, 1975, Ser. No. 573,027

Claims priority, application United Kingdom, Dec. 18, 1972, 59742/72; Jan. 29, 1973, 4387/73

Int. Cl.² A61K *37/26*

U.S. Cl. 424—178 **6 Claims**

1. An injectable formulation for producing a hypoglycaemic response comprising an effective amount of des-Lys^{29}-Ala^{30}-porcine insulin and a major amount of a pharmaceutically acceptable diluent or solvent.

3,989,822

WEIGHT CONTROL COMPOUND

Roy L. Whistler, West Lafayette, Ind., assignor to Purdue Research Foundation, Lafayette, Ind.

Filed Feb. 14, 1974, Ser. No. 442,447

Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 **10 Claims**

1. A method for controlling body weight which consists essentially of administering to a recipient at least an effective amount of 5-Thio-D-glucose over a period of time fo effect weight reduction in said recipient.

3,989,823

COMPOSITIONS FOR COMBATING NICOTINISM IN MAN

Francois Di Costanzo, 28 Rue Pauline Borghese, 92200 Neuilly, France

Filed Mar. 28, 1975, Ser. No. 562,922

Claims priority, application France, Mar. 29, 1974, 74.11064

Int. Cl.² A61K *35/78*

U.S. Cl. 424—195 **9 Claims**

1. A composition for combating nicotinism, comprising:

10–15% by wt. dry extract of valerian in an amount sufficient to modify the gustatory and olfactory sensations,

6.5–15% by wt. vitamin B_1 in an amount sufficient to correct disturbed glucidic metabolism;

30–55% by wt. vitamin B_6 in an amount sufficient to correct neuritis and trembling resulting from the deprivation of nicotine;

30–40% by wt. ascorbic acid in an amount sufficient to compensate for the fall in the amount of ascorbic acid in the biological media of smokers, and

a sufficient quantity of pharmaceutically acceptable excipient to give 100%.

3,989,824

METHOD FOR CONTROLLING ACARIDS WITH PHOSPHINE OXIDES

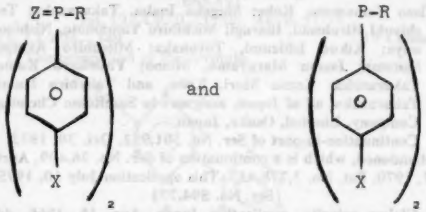
Edwin L. Sukman, Fanwood, N.J., assignor to M & T Chemicals Inc., Greenwich, Conn.

Filed Mar. 6, 1975, Ser. No. 555,884

Int. Cl.² A01N *9/36*

U.S. Cl. 424—204 **8 Claims**

1. A method for controlling acarids by applying to the acarids, their eggs or to substrates susceptible to infestation with said acarids an acaricidally effective amount of a phosphorus compound exhibiting the formula



wherein R is selected from the group consisting of alkyl containing 1 to 12 carbon atoms, haloalkyl containing 1 to 12 carbon atoms, alkenyl containing between 2 and 12 carbon atoms and alkynyl containing between 2 and 12 carbon atoms, X represents a halogen atom selected from the group consisting of fluorine, chlorine, bromine and iodine and Z represents oxygen or sulfur.

3,989,825

SECONDARY PHOSPHORIC ACID ESTERS

Bertil Högberg; Hans Fex; Torsten Perklev; Sten Veige, all of Helsingborg, and Bo Göran Fredholm, Nyhamnslage, all of Sweden, assignors to Aktiebolaget Leo, Helsingborg, Sweden

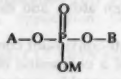
Filed Aug. 14, 1972, Ser. No. 280,211

Claims priority, application United Kingdom, Aug. 17, 1971, 38578/71; Jan. 31, 1972, 4510/72

Int. Cl.² C07F *9/12; 9/09*

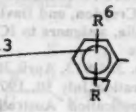
U.S. Cl. 424—212 **21 Claims**

1. A novel secondary phosphoric acid ester compound having the general formula

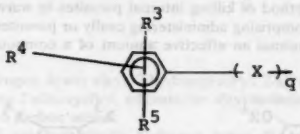


(I)

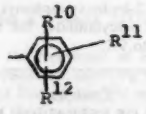
wherein M is selected from the group consisting of hydrogen and a pharmaceutically acceptable inorganic and organic cation, and wherein A and B, independent of each other, are



wherein one and only one of the substituents R^6, R^7, and R^{13} always represents a group R, located in any of the ortho, meta and para positions relative to the phosphoric acid ester group, the group R having the formula



wherein *q* is selected from the group consisting of zero and one, and wherein X is selected from the group consisting of: straight saturated hydrocarbon chains having at most 4 carbon atoms; and straight hydrocarbon chains having 2 to 4 carbon atoms and containing one double bond; wherein X above may be substituted by at most two substituents selected from the group consisting of: lower alkyl; lower alkenyl; cyclopentyl; cyclohexyl; phenyl; phenyl substituted in m- or p- position by one substituent selected from the group consisting of lower alkyl, lower alkoxy, —F, Cl, —Br, and $—CF_3$; benzyl; benzyl substituted in m- or p- position by one substituent selected from the group consisting of lower alkyl, lower alkoxy, —F, —Cl, —Br, and $—CF_3$; benzylidene; benzylidene substituted in m- or p- position by one substituent selected from the group consisting of lower alkyl, lower alkoxy, —F, —Cl, —Br, and $—CF_3$; and lower alkylidene; with the proviso that not more than one substituent selected from the group consisting of: cyclopentyl; cyclohexyl; phenyl; substituted phenyl; benzyl; substituted benzyl; benzylidene; and substituted benzylidene is present in X; wherein B in the general formula (I) above also may be selected from the group consisting of: alkyl, having one to eight carbon atoms, inclusive, being at most di-substituted; cycloalkyl, namely cyclopentyl and cyclohexyl, being at most di-substituted; 1- and 2-naphthyl, both naphthyls being at most di-substituted; and



wherein the substituents in B, when B is alkyl, having one to eight carbon atoms, inclusive; cycloalkyl; or naphthyl, are selected from the group consisting of lower alkyl, lower alkoxy, —F, —Cl, —Br, and $—CF_3$; wherein R^3, R^4, R^5, R^6, R^7, R^{10}, R^{11}, R^{12}, and R^{13} above are selected from the group consisting of: hydrogen; lower alkyl; lower alkenyl; lower alkoxy; hydroxy; —O—CO—R^{14}; —F; —Cl; —Br; $—CF_3$; where R^{14} is lower alkyl; with the proviso that always one of the substituents, being attached to an aromatic group of A or B as defined above, is selected from the group consisting of lower alkoxy; hydroxy; and —O—CO—R^{14}.

20. A composition of matter comprising as an active ingredient a compound according to claim 1 in combination with a pharmaceutically acceptable carrier.

3,989,826

METHOD OF KILLING INTERNAL PARASITES USING SALICYLANILIDES

Bruce Adam Forsyth, Croydon, and David Ernest Pryor, Balwyn, both of Australia, assignors to ICI Australia Limited, Melbourne, Australia

Division of Ser. No. 355,813, April 30, 1973, Pat. No. 3,927,071. This application July 10, 1974, Ser. No. 487,133

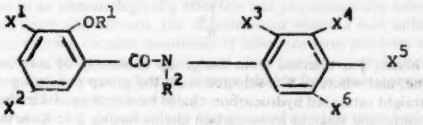
Claims priority, application Australia, May 12, 1972, 8942/72; Aug. 3, 1972, 9940/72; Dec. 5, 1972, 1505/72

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.[2] A61K *31/60*

U.S. Cl. 424—230 **7 Claims**

1. A method of killing internal parasites in warm blooded animals comprising administering orally or parenterally to an infected animal an effective amount of a compound of the formula:



where R^1 is hydrogen or acetyl, R^2 is hydrogen, acetyl or lower alkyl, X^1 and X^2 are iodine atoms; X^3, X^4, X^5 and X^6 which may be the same or different are chlorine, bromine, iodine, trifluoromethyl or hydrogen; at least two and not more than two of X^3, X^4, X^5 and X^6 are hydrogen; when X^3 is chlorine, bromine, iodine or trifluoromethyl, then X^4 and X^6 are both hydrogen; and at least one of X^3, X^4, X^5 and X^6 is trifluoromethyl, said compound being administered in a dosage amount of from 1 to 50 mg per Kg animal bodyweight.

3,989,827

ANTIBACTERIAL COMPOSITION

George Nikolas Apostolatos, New York, N.Y.; James Calvin Bohrer, East Brunswick, and Jack Thomas Inamorato, Westfield, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 502,577, Oct. 22, 1965, which is a division of Ser. No. 709,799, March 1, 1968, abandoned. This application Oct. 8, 1971, Ser. No. 187,893

Int. Cl.[2] A61K *31/605*

U.S. Cl. 424—235 **3 Claims**

1. An antibacterial composition effective against gram-positive and gram-negative bacteria comprising:
   1. 4,2',4'-trichloro-2-hydroxy diphenyl ether, and
   2. 3,5,4'-tribromo salicylanilide, the ratio of (1) to (2) being about 1:9 to 9:1.

3,989,828

MIXED ESTERS OF ESTRADIOL AND ZERANOL

Robert Aries, 69, rue de la Faisanderie, 75116-Paris, France

Filed Aug. 9, 1974, Ser. No. 496,163

Claims priority, application France, Aug. 9, 1973, 73.29133

Int. Cl.[2] A61K *31/56*

U.S. Cl. 424—240 **19 Claims**

1. A mixed ester formed from a pharmaceutically acceptable dicarboxylic acid selected from the group consisting of malonic, succinic, glutaric, adipic, pimelic, suberic, azelaic, sebacic, dimethyl-2,2-malonic, ethyl-2-methyl-2-malonic, ethyl-2-propyl-2-malonic, ethyl-2-butyl-2-malonic, ethyl-2-amyl-2-malonic, maleic, fumaric, glutaconic, muconic, 2,3-dihydromuconic, 2,5-dihydromuconic, 2-heptene-1,7-dioic, 3-heptene-1,7-dioic, 2,4-heptadiene-1,7-dioic, subercolic, glutamic, 2-hydroxyglutamic, aspartic, malic, tartronic, tartaric, phthalic, terephthalic, hexahydrophthalic and hexahydroterephthalic acids esterified with both estradiol or a monoester thereof and zeranol or a mono- or diester thereof, said mono- or diesters of estradiol and zeranol being with a monocarboxylic acid or acids selected from the group consisting of the following acids: formic, acetic, propionic, butyric, isobutyric, pivalic, valeric, isovaleric, caproic, isocaproic, heptanoic, caprylic, isocaprylic, pelargonic, capric, undecanoic, undecenoic, lauric, pyristic, palmitic, stearic, oleic, linoleic, lonoenic, margaric, arachidic, acetoxy-acetic, propionoxyacetic, butoxyacetic, phenoxyacetic, chloroacetic, dichloroacetic, fluoroacetic, difluoroacetic, phenylacetic, diphenylacetic, methoxyacetic, ethoxyacetic, methylthioacetic, ethylthioacetic, methylsulphinylacetic, ethylsulphinylacetic, methylsulphonylacetic, ethylsulphonylacetic, propylsulphonylacetic, isopropylsulphonylacetic, cyclopentylsulphonylacetic, cyclohexylsulphonylacetic, phenylsulphonylacetic, phenoxyethylsulphonylacetic, (4-methoxyphenoxy)-2-ethylsulphonylacetic, benzoic, hexahydrobenzoic, 4-nitrophenylacetic, 4-acetamidophenylacetic, 4-trifluoroacetamidophenylacetic, phenylpropionic and nicotinic acids.

3,989,829

1,4-BENZODIAZEPINES

Hisao Yamamoto, Kobe; Shigeho Inaba, Takarazuka; Toshiyuki Hirohashi, Ibaragi; Michihiro Yamamoto, Nishinomiya; Kikuo Ishizumi, Toyonaka; Mitsuhiro Akatsu, Saitama; Isamu Maruyama, Minoo; Yoshiharu Kume, Takarazuka; Kazuo Mori, Kobe, and Takahiro Izumi, Takarazuka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

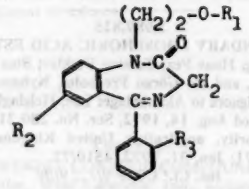
Continuation-in-part of Ser. No. 301,952, Oct. 30, 1972, abandoned, which is a continuation of Ser. No. 26,409, April 7, 1970, Pat. No. 3,778,433. This application July 10, 1975, Ser. No. 594,771

Claims priority, application Japan, Apr. 18, 1969, 44-30601; Apr. 18, 1969, 44-30603; Apr. 18, 1969, 44-30606; Apr. 24, 1969, 44-32220; May 28, 1969, 44-41873; May 29, 1969, 44-42213; July 3, 1969, 44-52868

Int. Cl.[2] C07D *243/24*

U.S. Cl. 424—244 **8 Claims**

1. A compound of the formula,



wherein R_1 is a C_{2-4} alkenyl group, R_2 is a halogen atom and R_3 is a hydrogen or halogen atom, and its pharmaceutically acceptable salts.

7. A tranquilizing and anti-convulsant composition comprising an effective amount of a compound of claim 1 together with a pharmaceutically acceptable carrier.

3,989,830
STABILIZATION OF COPPER COMPLEXES OF 6-METHOXY-1-PHENAZINOL 5,10-DIOXIDE

Martin Howard Infeld, Montclair, and Harold Leon Newmark, Maplewood, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 141,382, May 7, 1971, abandoned. This application Aug. 1, 1974, Ser. No. 493,955

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976

Int. Cl.[2] A61K *31/555*

U.S. Cl. 424—245 **8 Claims**

6. A pharmaceutical composition containing, as the active ingredient, an amount of the copper II complex of 6-methoxy-1-phenazinol 5,10-dioxide which is effective as an antimicrobial agent in the composition and, as a stabilizer, from about 2% to about 20% molar excess of copper ions based on the copper content in copper myxin, said excess copper ions provided from an aqueous stabilizer-buffer solution containing an amount of a water soluble copper II salt sufficient to provide the molar excess.

8. The pharmaceutical composition as in claim 6 containing, in percents by weight based on the total weight of the composition, 0.5% of the copper II complex of 6-methoxy-1-phenazinol 5,10-dioxide, 0.019% of cupric acetate monohydrate and 0.2% of sodium acetate trihydrate, said cupric acetate monohydrate and sodium acetate trihydrate provided from the aqueous stabilizer-buffer solution.

3,989,831
TOPICALLY-ACTIVE ANTI-INFLAMMATORY 3-CHLORO-5,6-DIARYL-1,2,4-TRIAZINES

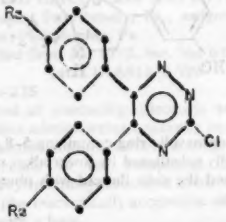
William B. Lacefield, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 438,156, Jan. 31, 1974, Pat. No. 3,948,894. This application Mar. 10, 1976, Ser. No. 665,591

Int. Cl.[2] C07D *253/06;* **A61K** *31/53*

U.S. Cl. 424—249 **19 Claims**

1. The compound of the formula,



wherein R_2 and R_3 independently are halo, C_1–C_3 alkoxy, or di(C_1–C_3 alkyl)amino;
and the pharmaceutically-acceptable acid addition salts of basic members thereof.

3,989,832
COMBATING BACTERIA WITH NITROIMIDAZOLYL-TRIAZOLO-PYRIDIAZINE COMPOUNDS

Herbert Berger, Mannheim-Kafertal; Rudi Gall, Grossachsen; Kurt Stach, Mannheim-Waldhof; Wolfgang Vomel, and Rita Hoffmann, both of Mannheim, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim, Germany

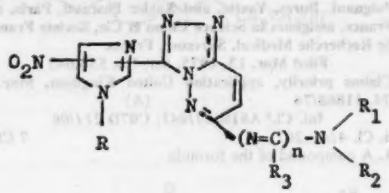
Division of Ser. No. 336,099, Feb. 26, 1973, Pat. No. 3,928,349. This application July 31, 1975, Ser. No. 600,533

Claims priority, application Germany, Apr. 1, 1972, 2215999

Int. Cl.[2] A01N *9/00, 9/22*

U.S. Cl. 424—250 **15 Claims**

1. A method of combating a bacterial infection in a mammal which comprises administering to such mammal an antibacterially effective amount of a nitroimidazolyl-triazolo-pyridazine compound of the formula



wherein

R is hydrogen, lower alkyl, 2-hydroxyl-alkyl, 2-alkanoyloxy-alkyl, or 2-alkoxyalkyl, wherein the alkyl moieties contain up to 6 carbon atoms;

R_1 and R_2 are, individually, hydrogen, lower alkanoyl, aroyl, alkoxycarbonyl, alkyl, cycloalkyl, wherein the alkyl or cycloalkyl radicals may contain a hydroxyl, alkoxy or amino group or an alkyl-, alkanoyl- or aroyl- amino group;

R_1 and R_2, taken together, represent with the N-atom piperidino, hydroxy-piperidino, alkyl-piperidino, piperazino, alkyl-piperazino or morpholino;

R_1 and R_2, taken together, can also represent dialkylsulfimino or dialkylsulfoximino;

R_3 is hydrogen or alkyl; or

R_3, together with R_2, represents an alkylene bridge of from 3 to 4 carbon atoms; wherein the alkyl groups or moieties contained in the R_1, R_2 and R_3 radicals are of from 1 to 6 carbon atoms in each instance, the aryl groups or moieties are of 6 carbon atoms and the cycloalkyl groups or moieties are of 3 to 8 carbon atoms; and

n is 0 to 1; **or a pharmacologically acceptable salt thereof.**

3,989,833
PHARMACEUTICAL COMPOSITIONS CONTAINING ADENINE DERIVATIVES

Rochus Jonas; Werner Mehrhof; Karl Heinz Becker, and Hans-Jochen Schliep, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

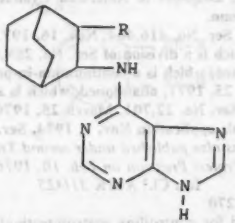
Filed Nov. 4, 1974, Ser. No. 520,888

Claims priority, application Germany, Nov. 7, 1973, 2355536

Int. Cl.[2] A61K *31/52*

U.S. Cl. 424—253 **7 Claims**

7. A method for the treatment of intravascular pain in humans which comprises administering to a human suffering therefrom an amount from 3 to 500 mg. per dosage of an adenine derivative of the formula



wherein R is phenyl or thienyl, or a physiologically acceptable acid addition salt thereof effective to ameliorate the pain.

3,989,834
ALKOXY ANILIDES AND PHARMACEUTICAL COMPOSITIONS

Charles Malen, Fresnes; Pierre Roger, St-Cloud; Jean-Claude Poignant, Bures, Yvette, and Xavier Pascaud, Paris, all of France, assignors to Science Union et Cie, Societe Francaise de Recherche Medical, Suresnes, France

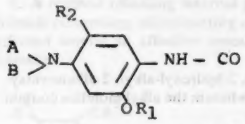
Filed Mar. 13, 1975, Ser. No. 558,043

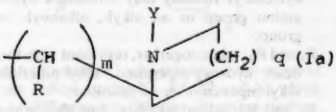
Claims priority, application United Kingdom, Mar. 18, 1974, 11868/74

Int. Cl.² A61K *31/445*; **C07D** *211/06*

U.S. Cl. 424—267 **7 Claims**

1. A compound of the formula





wherein:

m is O or an integer of 1 to 5;

q is 3;

R is hydrogen or lower alkyl of 1 to 6 carbon atoms in the chain;

R_1 is lower alkyl of 1 to 6 carbon atoms, lower alkenyl of 2 to 6 carbon atoms, or phenyl lower alkyl of 1 to 4 carbon atoms in the side chain;

R_2 is halo or lower alkoxy of 1 to 6 carbon atoms;

Y is lower alkyl of 1–6 carbon atoms

A and B which may be the same or different, each represents a hydrogen atom, a lower alkyl radical or an acyl radical derived from an organic carboxylic acid of from 1 to 18 carbon atoms.

6. A method for treating or preventing gastric ulcers due to gastric hypersecretion and/or delay in gastric evacuation which consists in administering to warm-blooded animals suffering or disposed to suffer from said ailments a gastric secretion inhibitory effective amount of a compound of claim **1.**

3,989,835
METHOD OF USING 6-SUBSTITUTED AMINO PHENYL-2,3,5,6-TETRA-HYDRO[2,1-b]THIAZOLES FOR CONTROLLING GASTROINTESTINAL NEMATODES

Larry Dean Spicer, Princeton, and John James Hand, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

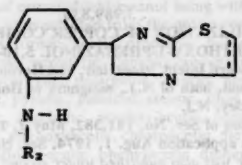
Division of Ser. No. 416,464, Nov. 16, 1973, Pat. No. 3,899,583, which is a division of Ser. No. 289,016, Sept. 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 174,939, Aug. 25, 1971, abandoned, which is a continuation-in-part of Ser. No. 22,701, March 25, 1970, Pat. No. 3,673,205. This application Nov. 7, 1974, Ser. No. 521,711

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² A61K *31/425*

U.S. Cl. 424—270 **4 Claims**

1. A method for controlling gastrointestinal nematodes in warm-blooded animals comprising administering to said animals, a nematocidally effective amount of a compound of the formula:



wherein R_2 is selected from the group consisting of naphthoyl, furoyl and adamantyl carbonyl, and ═══ is a single or double bond and the pharmaceutically acceptable salts thereof.

3,989,836
METHOD FOR TREATING CARDIOVASCULAR CIRCULATORY INSUFFICIENCIES AND HYPOTONIA WITH 2-HYDROXYPHENYL-1-OXA-4-AZASPIROALKANE DERIVATIVES

Gerhard Satzinger, Denzlingen, and Manfred Herrmann, St. Peter, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

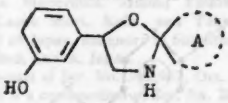
Division of Ser. No. 484,376, June 28, 1974, Pat. No. 3,931,212. This application Mar. 10, 1975, Ser. No. 557,134

Claims priority, application Germany, July 19, 1973, 2336746

Int. Cl.² A61K *31/42*

U.S. Cl. 424—272 **7 Claims**

1. A method for increasing arterial blood pressure in a mammal suffering from cardiovascular circulatory insufficiencies and hypotonia which comprises the administration to said mammal of a therapeutically effective amount of a compound of the formula:



wherein A is a carboxyclic ring containing 5–8 carbon atoms which is optionally substituted by lower alkyl radicals or hydroxyl groups, and the salts thereof with pharmacologically compatible acids.

3,989,837
PHARMACEUTICAL COMPOSITIONS

Magda Huhn; László Tardos; Eva Somfai; Gábor Resorszki; Vera Kovacs nee Mindler, and Maria Palffy nee Oswald, all of Budapest, Hungary, assignors to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT, Budapest, Hungary

Continuation-in-part of Ser. No. 387,964, Aug. 13, 1973, Pat. No. 3,886,279. This application Apr. 4, 1975, Ser. No. 565,115

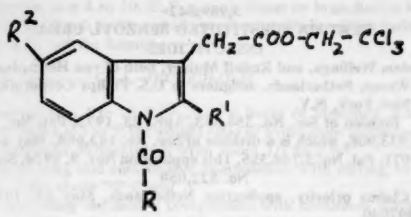
Claims priority, application Hungary, Aug. 24, 1972, CI1268

The portion of the term of this patent subsequent to May 27, 1992, has been disclaimed.

Int. Cl.² A61K *31/40*, *31/44*, *31/425*

U.S. Cl. 424—274 **2 Claims**

1. A method of treating gastric ulcers in a human patient comprising the step of administering orally or rectally an effective amount of an active ingredient in the form of a compound of the formula



wherein

R is a phenyl chlorophenyl naphthyl, pyrrole, furane, furazole, thiazole, thiadiazole or pyridine group;

R^1 is hydrogen or alkyl having 1 to 7 carbon atoms;

R^2 is hydrogen, alkyl, having 1 to 7 carbon atoms, alkoxy having 1 to 7 carbon atoms, or dialkylamino having 1 to 7 carbon atoms per alkyl group in admixture with a pharmaceutical carrier.

3,989,838

URICOSURIC COMPOSITIONS AND METHOD OF PRODUCING URICOSURIA AND HYPOURICEMIA

Alfred R. Maass, Swarthmore, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed Sept. 22, 1975, Ser. No. 615,253

Int. Cl.² A61K *31/38*

U.S. Cl. 424—275 **8 Claims**

1. A method of producing uricosuria and hypouricemia which comprises administering internally to a subject in need thereof a nontoxic amount sufficient to produce uricosuria and hypouricemia of the compound 2,3-dichloro-4-(α-hydroxy-2-thenyl)phenoxyacetic acid or an alkali metal salt of said acid or a pharmaceutically acceptable addition salt of said acid formed with a base.

3,989,839

6,11-DIHYDRODIBENZO-THIEPIN-11-ONES, COMPOSITIONS AND USES THEREOF

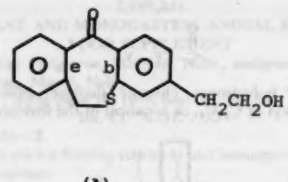
Jack Ackrell, Mexico City, Mexico, assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Aug. 13, 1975, Ser. No. 604,291

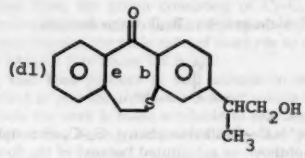
Int. Cl.² C07D *337/12*

U.S. Cl. 424—275 **21 Claims**

1. A compound selected from the group of compounds represented by the formulas:



(A)



(B)

and the pharmaceutically acceptable esters and ethers thereof containing from 1 to 12 carbon atoms.

3,989,840

CONTROL OF ANIMAL PARASITES WITH RING-SUBSTITUTED N-(2,2-DIFLUOROALKANOYL)-O-PHENYLENEDIAMINES

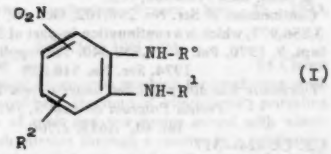
George Oliver Plunkett O'Doherty, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed July 18, 1975, Ser. No. 597,862

Int. Cl.² A61K *31/27, 31/34, 31/165*

U.S. Cl. 424—300 **20 Claims**

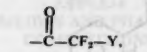
1. A method of killing insect and acarina parasites which consume living tissues of a host animal which comprises orally or percutaneously administering to the host animal a parasiticidally-effective amount of a compound of the formula:



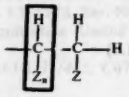
(I)

wherein

R^a is a 2,2-difluoroalkanoyl radical of the formula

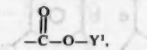


in which Y is hydrogen, chlorine, fluorine, difluoromethyl, perfluoroalkyl of C_1–C_6, or a radical of the formula

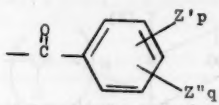


in which each Z independently is hydrogen or halogen and n is 0 or 1;

R^1 is R°, hydrogen, a radical of the formula



in which Y^1 is C_1–C_4 alkyl or phenyl, C_1–C_8 alkanoyl, benzoyl, furoyl, naphthoyl, or substituted benzoyl of the formula



in which each Z′ independently is halo or nitro, Z″ is C_1–C_4 alkyl or C_1–C_4 alkoxy, p is 0, 1, or 2, q is 0 or 1, and the sum of p and q is 1–3;

R^2 is trifluoromethyl, difluoromethyl, or chlorodifluoromethyl, and the nitro group and R^2 are meta to one another; and

subject to the further limitation that where R^1 is hydrogen, the ring position ortho to the —NH—R^1 group bears one of the designated nitro or R^2 moieties.

3,989,841

METHOD OF USING FLUORENE-2-ACETIC ACID DERIVATIVES

Eric T. Stiller, Sarasota, Fla.; Seymour D. Levine, North Brunswick, N.J.; Pacifico A. Principe, South River, N.J., and Patrick A. Diassi, Westfield, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation of Ser. No. 298,102, Oct. 16, 1972, Pat. No. 3,856,977, which is a continuation-in-part of Ser. No. 70,913, Sept. 9, 1970, Pat. No. 3,859,340. This application Sept. 30, 1974, Ser. No. 510,850

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² A61K *27/00*

U.S. Cl. 424—317 **4 Claims**

1. A method for treating inflammatory conditions in a mammalian host responsive to treatment with anti-inflammatory agents, which comprises administering to a mammalian host an effective amount of a compound selected from the group consisting of 7-halo-fluorene-2-acetic acid, 7-amino-fluorene-2-acetic acid, and 7-nitrofluorene-2-acetic acid.

3,989,842

CERTAIN SUBSTITUTED BENZOYL UREA INSECTICIDES

Kobus Wellinga, and Rudolf Mulder, both of van Houtenlaan, Weesp, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

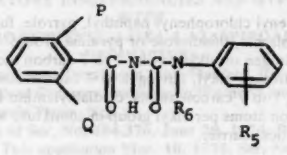
Division of Ser. No. 354,393, April 25, 1973, Pat. No. 3,933,908, which is a division of Ser. No. 143,668, May 14, 1971, Pat. No. 3,748,356. This application Nov. 8, 1974, Ser. No. 522,058

Claims priority, application Netherlands, May 15, 1970, 7007040

Int. Cl.² A01N *9/20*

U.S. Cl. 424—322 **66 Claims**

1. An insecticidal composition comprising a finely divided inert carrier and an insecticidally effective amount of an insecticidally effective compound of the formula:



wherein P and Q are each independently selected from the group consisting of chlorine, fluorine and methyl, R_6 is selected from the group consisting of hydrogen and lower alkyl and R_5 is a moiety located at at least one of the positions 3 and 4 of the phenyl ring to which it is attached and is selected from the group consisting of halogen, alkyl of 1–15 carbons, halogen derivatives of said alkyl, cyclopropyl and halogenated cyclopropyl.

3,989,843

EMULSIFICATION OF FLUOROCARBON COMPOUNDS FOR BIOLOGICAL APPLICATION AS OXYGEN TRANSPORTERS

Pierre Chabert, Saint Genis Laval; Louis Foulletier, and André Lantz, both of Oullins, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Oct. 22, 1974, Ser. No. 516,899

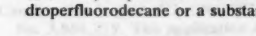
Claims priority, application France, Nov. 7, 1973, 73.39533

Int. Cl.² A61K *31/13*

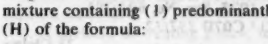
U.S. Cl. 424—325 **7 Claims**

1. A method of preparing an aqueous oxygen-transporting emulsion suitable for injection into the bloodstream which comprises

i. combining water with from about 5 to 35% by volume base on the water of a polyfluorinated carbon compound which is perfluorobutylamine, perfluorotributylamine, perfluorinated butyltetrahydrofuran, perfluorooctane, perfluoronaphthalane, perfluoromethylnaphthalene, 1,1,2-trihydroperfluoro-1-decane, 1,1,1,2,2-pentahydroperfluorodecane or a substance having the formula



wherein p and q are identical or different whole numbers from 2 to 10 and wherein their sum $(p+q)$ is equal to or greater than 8; and a mixture of polyfluorinated surfactants whose total weight is from about 5 to 20% of the weight of the water, said mixture containing (1) predominantly hydrophilic surfactants (H) of the formula:



wherein *m* is 4 to 10, C_mF_{2m+1}— is linear or branched, *a* is 1 to 4, and *n* is 6 to 40, and (2) predominantly lipophilic surfactants (L) of the formula:

$$C_mF_{2m+1}-(CH_2)_a-O(CH_2CH_2O)_nH$$

wherein *m* is 4 to 10, C_mF_{2m+1}— is linear or branched, *a* is 1 to 4, and *n* is 1 to 5; the weight ratio of hydrophilic surfactants to lipophilic surfactants is from about 1/1 to 2.5/1,

ii. heating said emulsifiable composition, with stirring, to at least about 70° C and

iii. cooling the heated composition with continued stirring until a transparent emulsion is formed.

3,989,844

BASIC OXIMES AND THEIR PREPARATION

Siegismund Schutz; Otto Behner, and Friedrich Hoffmeister, all of Wuppertal-Elberfeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

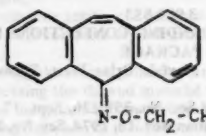
Division of Ser. No. 849,539, July 14, 1969, which is a continuation of Ser. No. 587,696, Oct. 19, 1966, abandoned. This application June 11, 1971, Ser. No. 152,449

Claims priority, application Germany, Nov. 10, 1965, 47635

Int. Cl.² A61K *31/15*

U.S. Cl. 424—327 **6 Claims**

1. An antidepressant composition which comprises an antidepressant amount of a compound of the formula:



or a pharmaceutically acceptable non-toxic acid salt thereof in combination with a pharmaceutically acceptable inert diluent or carrier.

3,989,845

ANESTHETIC CHLOROCYCLOPROPANES

Charles Alden Billings, Concord; Gerald Joseph O'Neill, Arlington; Charles William Simons, Bedford, and Robert S. Holdsworth, Arlington, all of Mass., assignors to W. R. Grace & Co., Cambridge, Mass.

Filed Dec. 26, 1974, Ser. No. 536,589

The portion of the term of this patent subsequent to Feb. 11, 1992, has been disclaimed.

Int. Cl.² H61K *31/025*

U.S. Cl. 424—352 **8 Claims**

1. The process of inducing anesthesia in a mammal, which comprises administering by inhalation to said mammal an effective quantity for inducing anesthesia, of a cyclopropane selected from the group consisting of:

1,1-dichloro-2-methyl-2,3,3-trifluorocyclopropane, 1,2-dichloro-1-fluoro-2-methylcyclopropane, 1,1,2-trichloro-2,3,3-trifluorocyclopropane, 1,1-dichloro-2-trifluoromethyl-2,3,3-trifluorocyclopropane, 1,2-dichloro-1,2,3,3-tetrafluorocyclopropane, 1,1,2,2-tetrachloro-3,3-difluorocyclopropane and 1,1-dichloro-2,3,3-trifluorocyclopropane.

3,989,846

RUMINANT AND MONOGASTRIC ANIMAL FEED AND FOOD SUPPLEMENT

Candace Kay Helgerson, Mitchell, Nebr., assignor to Blue J. Feeds, Inc., Marril, Nebr.

Filed June 10, 1975, Ser. No. 585,500

Int. Cl.² A23K *1/22*

U.S. Cl. 426—2 **18 Claims**

1. A process for feeding ruminant and monogastric animals, which comprises:

adding to the diet of ruminant and monogastric animals a feed product formed by reacting urea in an aqueous medium, at a temperature in the range of about 5°–90° C., with a urea-aldehyde pre-condensate or with a member selected from the group consisting of C_1–C_3 aliphatic aldehydes, polymers of C_1–C_3 aliphatic aldehydes and mixtures thereof, the mole ratio of aldehyde to urea being from about 1:3 to about 1:8.6, and

feeding said feed product to said animals in an amount sufficient to provide urea as an indirect source of protein in which the urea is made available to said animals at a controlled rate during said animals' digestive processes.

3,989,847

PROCESS FOR PREPARATION OF SEASONINGS DERIVED FROM ANIMAL MEAT

Shinji Kurihara, 7-8, 3-chome, Nishicho, and Kazuharu Osazima, 1037-8, Shirahagi, Mizunomicho, both of Fukuyama, Hiroshima, Japan

Filed Sept. 23, 1975, Ser. No. 615,889

Claims priority, application Japan, May 20, 1975, 50-60079

Int. Cl.² A22C *18/00*

U.S. Cl. 426—7 **8 Claims**

1. A process for the preparation of seasonings derived from animal meat, which comprises grinding a raw animal meat containing material to recover meat contained therein in the form of a slurry, adding an acid to the slurry to adjust the pH within a range of from 4.0 to 5.0, agitating and heating the slurry at a temperature not exceeding 50° C. to promote in situ enzyme activity and begin amino acid decomposition of protein by autolysis, further adding an acid to the slurry to lower the pH to about 2.5, boiling the slurry at a temperature ranging from 90° to 100° C. to effect moderate acid decomposition and thereby facilitate dissolving out and extraction of taste components contained in the meat, adding an alkali to the slurry to effect neutralization and adjust the pH to 6.0 to 7.0, separating the resulting coagulated protein substances, insoluble protein substances and fats from the slurry, and filtering the residual liquid extract.

3,989,848

METHOD OF MASHING FOR THE PRODUCTION OF WORT AND APPARATUS FOR THE CARRYING OUT OF THIS PROCESS

Manfred Moll, 13ter rue de Houdemont, 54500 Van Doeuvre; Michel F. Bastin, 4551 tour Panoramique, 54100 Nancy, and Bruno Peters, 8 rue des Bateleurs, 54410 vandiveirlieduont-Nancy, all of France

Filed Nov. 29, 1974, Ser. No. 528,239

Claims priority, application France, Nov. 29, 1973, 73.43301

Int. Cl.² C12C *7/04*

U.S. Cl. 426—30 **15 Claims**

1. In a process of continuous mashing for producing mash in the production of beer, the steps of: continuously providing a mash mixture of malt and raw grains mixed with water; passing said mash mixture through a reactor in a continuous manner to produce mash; heating said mash mixture during its passage through the reactor to progressively raise the temperature therefor at a substantially constant temperature gradient thereby preserving the enzymatic potential of the mash mixture constituents throughout the length of the reactor; and agitating said mash mixture during its passage through the reactor to promote the extraction and diffusion of the active

mash mixture constituents and prevent overheating of said mash mixture.

3,989,849

IMPROVING THE FLAVOR OF DECAFFEINATED COFFEE BY RADIO FREQUENCY HEATING TO RAPIDLY DRY COFFEE BEANS

Harvey P. Fogel, Goshen, and Irving Holzberg, Spring Valley, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Mar. 23, 1973, Ser. No. 344,395

Int. Cl.² A21D *6/00*

U.S. Cl. 426—242 **13 Claims**

1. A process for improving the flavor of decaffeinated coffee comprising decaffeinating the green coffee beans and drying the beans by the application of radio frequency heating, for a period of time of about 2 to about 90 minutes at temperatures of about 70° F to about 360° F, the radio frequeny energy required being about 2 to about 40 kw minutes per pound of water removed, the thermal and radio frequency energies required, and the wavelength and duration of exposure to the same being sufficient to impart a porous structure to the bean without rupturing the same such that an improved flavor quality is demonstrated in the decaffeinated coffee product when roasted.

3,989,850

DECAFFEINATION PROCESS

William W. Erb, South Salem; William J. Einstman, Port Chester, both of N.Y.; Gary V. Jones, Ramsey, N.J., and George A. McGregor, Amawalk, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Dec. 13, 1974, Ser. No. 532,545

Int. Cl.² A23F *1/10*

U.S. Cl. 426—242 **12 Claims**

1. In a decaffeination process wherein caffeine-containing green coffee is added to one end of an extraction zone, and withdrawn from the other end of the extraction zone while a water solution of coffee solubles is flowed through said zone counter-current to said coffee, the improvement comprising removing surface solids from said withdrawn coffee such that less than about 0.3% by dry weight remain thereon, and subsequently drying said coffee at air temperatures not in excess of 200° F.

3,989,851

METHOD FOR PROTEIN FORTIFICATION OF EXTRA PUMPED MEATS

Robert Lyle Hawley, and William Bayard Tuley, both of St. Louis, Mo., assignors to Ralston Purina Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 500,219, Aug. 26, 1974, abandoned. This application Mar. 11, 1976, Ser. No. 665,830

Int. Cl.² A23L *1/27;* **A23B** *4/02, 4/14;* **A23L** *1/31*

U.S. Cl. 426—266 **6 Claims**

1. In a method of forming a meat product of the type wherein a liquid medium including a nutritional protein isolate, water and curing salt is prepared, stitch pumped into natural meat muscle tissue and allowed to cure, the improvement comprising:

a. preparing the liquid medium by first hydrating, at least 7% by weight of the medium, a salt tolerant protein isolate which forms a gel upon heat setting, in water, prior to admixing the curing salts;

b. subsequently admixing the curing salts to the hydrated salt tolerant protein isolate;

c. stitch pumping the natural meat tissue with the liquid medium to from 140 to 165% of its green weight;

wherein, upon curing, the liquid medium cooks to a uniformly distributed, meat-like gel, the extra pumped meat product maintains the same nutritional protein value and substantially identical textural properties of natural meat tissue, the protein substantially retains its hydrated form in the final product and there is substantially no protein separation.

3,989,852

METHOD FOR ENCAPSULATING MATERIALS

Edwin Palmer, 6000 Ivydene Terrace, Baltimore, Md. 21209

Continuation-in-part of Ser. No. 461,275, April 16, 1974, Pat. No. 3,903,295, which is a continuation-in-part of Ser. No. 253,770, May 16, 1972, abandoned. This application July 16, 1975, Ser. No. 596,371

The portion of the term of this patent subsequent to Sept. 2, 1992, has been disclaimed.

Int. Cl.² A23L *1/222*

U.S. Cl. 426—289 **7 Claims**

1. A process for encapsulating a material which tends to deteriorate upon exposure to autooxidative, humid or thermal conditions, which comprises:

forming a viscid medium comprising said material and a liquid,

dispersing said viscid medium as tacky particulates into an environment containing an agitated quantity of a dry, powdered, sorbent, film-forming agent such that said agent coats each of said particulates, absorbs liquid from the underlying particulate so as to constitute each of said particulates as a gel, and forms a continuous, self-drying encapsulating film around each of the gelled particulates whereby the original properties of the material are preserved, and

recovering the encapsulated gelled particulates.

3,989,853

METHOD FOR EXPANDING CONFECTIONS IN A PACKAGE

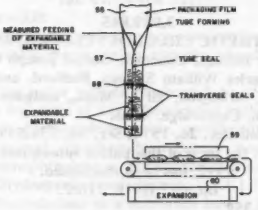
John H. Forkner, 2116 Mayfair Drive West, Fresno, Calif. 93703

Continuation-in-part of Ser. No. 398,120, Sept. 17, 1973, abandoned. This application Nov. 18, 1974, Ser. No. 524,347

The portion of the term of this patent subsequent to Jan. 16, 1990, has been disclaimed.

Int. Cl.² B65B *29/00, 25/00;* **A23G** *3/00*

U.S. Cl. 426—305 **11 Claims**



1. A method for the manufacture of a cellular expanded confection in bags comprising the steps of enclosing predetermined amounts of expandable confection pieces in bags, closing each bag at the end of the same by a seal extending across the bag, providing each bag with venting means in at least one wall of the same, and then expanding the confection in the bags by heating the bags and contents and subjecting the heated bags and contents to partial vacuum while the venting means is open.

3,989,854

CONTACTING CITRUS JUICE WITH A CELLULOSE ESTER ADSORBENT TO REMOVE LIMONIN

Bruce Veness Chandler, Chatswood, and Robert Leonard Johnson, North Ryde, both of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed Feb. 20, 1975, Ser. No. 551,292

Claims priority, application Australia, Feb. 21, 1974, 6670/74

Int. Cl.² A23L *2/00*

U.S. Cl. 426—422 **14 Claims**

1. A method of removing limonin from citrus fruit juice which consists of contacting the fruit juice with at least one cellulose ester adsorbent in gel or powder form in the absence of, an added enzyme.

3,989,855

FREEZING PROCESS FOR PRODUCTION OF INSTANT GRITS

Benjamin Bostick Jones, Savannah, Ga.; Richard John Karrasch, Sterrett, and Mike Kelly, Birmingham, both of Ala., assignors to The Jim Dandy Company, Birmingham, Ala.

Filed Dec. 18, 1974, Ser. No. 534,348

Int. Cl.² A23L *1/00, 3/00, 1/168*

U.S. Cl. 426—444 **10 Claims**

1. A process of treating grits material to produce a quick-cooking product, which possesses a texture and taste comparable to ordinary cooked grits material as well as good rehydration qualities, comprising:

a. fully gelatinizing the material in water wherein the ratio of water to grits during gelatinization is at least 3:1 by weight;

b. freezing the gelatinized material and water at a controlled rate until complete crystallization of the gelatinized material;

c. thawing the frozen gelatinized material;

d. squeezing the thawed material to separate excess water from the gelatinized material;

e. drying the material to a final moisture content of less than 10%, whereby a quick-cooking product is obtained.

3,989,856

3-FURYL BETA-OXOALKYL SULFIDES AND METHODS FOR USING SAME FOR ALTERING, MODIFYING OR ENHANCING THE ORGANOLEPTIC PROPERTIES OF FOODSTUFFS

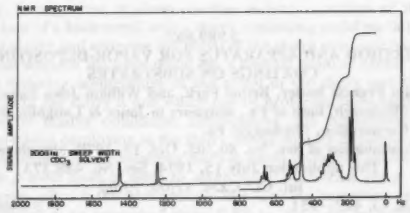
William J. Evers, Red Bank; Howard H. Heinsohn, Jr., Hazlet, and Christopher Giacino, Califon, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 581,894, May 29, 1975. This application Nov. 20, 1975, Ser. No. 633,791

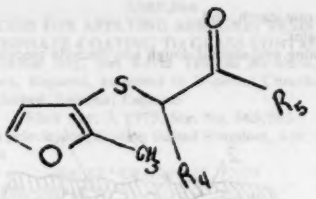
The portion of the term of this patent subsequent to Oct. 12, 1993, has been disclaimed.

Int. Cl.² A23L *1/231*

U.S. Cl. 426—535 **12 Claims**



1. A 3-furyl beta-oxoalkyl sulfide having the structure:



wherein R_4 is C_3 alkyl and R_5 is C_4 alkyl, R_4 being 2-propyl when R_5 is 2-methyl-1-propyl and R_4 being 1-propyl when R_5 is 1-butyl.

4. A process for augmenting or enhancing the meaty flavor of a foodstuff comprising the step of adding to said foodstuff from about 0.005 parts per million up to about 250 parts per million of a 3-furyl beta-oxoalkyl sulfide compound as defined in claim 1.

3,989,857

FLAVORING PHENOL OR PHENOL DERIVATIVE CONTAINING FOOD OR FEED WITH CYCLOALIPHATIC DERIVATIVES

Edouard P. Demole, Geneva, Switzerland, assignor to Firmenich S.A., Geneva, Switzerland

Division of Ser. No. 219,136, Jan. 19, 1972, Pat. No. 3,840,023. This application June 24, 1974, Ser. No. 482,512

Claims priority, application Switzerland, Jan. 19, 1971, 773/71; June 23, 1971, 9156/71; Jan. 11, 1972, 380/72

Int. Cl.² A23L *1/226*

U.S. Cl. 426—536 **4 Claims**

1. A product selected from the group consisting of foodstuffs, feedstuffs and beverages containing phenol or a phenol derivative having added thereto as flavour modifying ingredients at least one of the following compounds:

3,5,5-trimethyl-2,3-epoxy-cyclohexane-1,4-dione
2,6,6-trimethyl-cyclohex-2-en-4-ol-1-one
4,4,6-trimethyl-cyclohexa-2,5-dien-2-ol-1-one
3,5,5-trimethyl-cyclohex-3-en-1-yl acetate
3,5,5-trimethyl-cyclohex-2-ene-1,4-dione
3,5,5-trimethyl-cyclohex-2-ene-4-ol-1-one
2,2,6-trimethyl-cyclohexan-4-ol-1-one
3,5,5-trimethyl-cyclohexan-4-ol-1-one
3,5,5-trimethyl-4-methylene-cyclohex-2-en-1-one
3,5,5-trimethyl-cyclohexane-1,4-dione
3,5,5-trimethyl-4-hydroxy-4-cyclohex-2-en-1-one,
3,5,5-trimethyl-2-hydroxy-cyclohex-2-ene-1,4-dione and
3,5,5-trimethyl-cyclohex-2-en-ol-1-one.

in an amount of between 1 to about 1000 parts per million parts of said foodstuff, feedstuff or beverage.

3,989,858

RUSK BASED FOOD SNACK

David Arthur Williams, Ashby-de-la-Zouch, United Kingdom, assignor to United Biscuits Limited, Edinburgh, Scotland

Filed Sept. 3, 1974, Ser. No. 502,383

Claims priority, application United Kingdom, Sept. 19, 1973, 43961/73

Int. Cl.² A21D *2/00*

U.S. Cl. 426—552 **16 Claims**

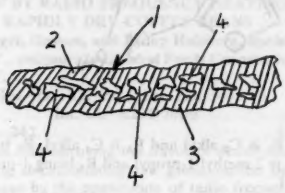
1. A process for the manufacture of an expanded food product, which consists essentially of the steps of:

1. providing a quantity of a particulate rusk material derived by baking a water-containing grain-based dough and thereafter comminuting the resultant baked product;

2. formulating a second dough by admixing together

a. the particulate rusk material of step (1),

b. a raw starch, and
c. water;
3. forming said second dough into discrete pieces;



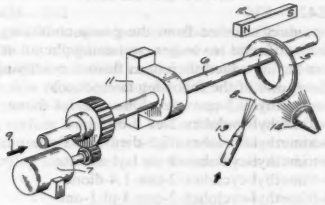
and
4. subjecting the discrete dough pieces to a frying step, whereby the dough pieces undergo expansion whilst being fried to produce expanded food product pieces characterized by having a relatively more porous internal structure within a less porous external structure.

3,989,859

COATING ENTIRE SURFACE OF THREE-DIMENSIONAL ARTICLE WITH HEAT FUSIBLE PLASTIC

Phillip E. Koerper, Brookfield, Wis., assignor to Koerper Engineering Associates, Inc., Brookfield, Wis.

Filed Nov. 14, 1974, Ser. No. 523,716
Int. Cl.² B05D *7/22, 3/12, 1/24*
U.S. Cl. 427—47 **10 Claims**



1. A method of applying to a ring-like metal core member for a wire wound electrical component a smooth, unmarked and unbroken coating of insulation that uninterruptedly covers all surface portions of the core member, said method comprising:
A. providing an elongated substantially cylindrical supporting member that has a diameter substantially smaller than the inside diameter of the core member;
B. rotatably supporting said elongated substantially cylindrical supporting member at only one end thereof with its axis substantially horizontal;
C. preheating the core member;
D. slipping the preheated core member onto said supporting member from its unsupported end, and allowing the core member to hang on the supporting member with only an inner surface portion of the core member in contact with the supporting member;
E. rotating said supporting member about its axis to thereby impart rotation to the core member and constantly change the location on the inner surface of the core member of the interface between it and the supporting member;
F. while said members are rotating, applying a heat fusible plastic material in finely divided solid form to the entire surface of the core member, which upon contact with said surface melts and fuses thereto;
G. abstracting heat from the supporting member to maintain it at a temperature below that at which the fusible material melts; and
H. continuing to rotate the supporting member, with the core member hanging thereon, until the coating of fused material on the core member has attained substantial hardness.

3,989,860

REPAIR TECHNIQUE FOR PHOTORECEPTORS

William G. Herbert, Webster, and Paul L. Gerace, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed July 22, 1974, Ser. No. 490,634
Int. Cl.² B23P *7/00;* **B05D** *5/12*
U.S. Cl. 427—142 **11 Claims**

1. A method of repairing an electrostatographic photoreceptor comprising a conductive substrate with a uniform layer of selenium or an alloy thereof as photoconductive material on its surface, wherein the photoconductive layer contains a depression of a depth less than its total thickness, which method comprises the steps of:
a. providing a photoconductive composite, comprised of an organic binder with a photoconductive pigment as sensitizer, which exhibits discharge properties similar to the photoconductive layer when applied to the depression in an amount just sufficient to fill it;
b. dispersing the photoconductive composite in an organic solvent for the organic binder to provide a flowable dispersion;
c. applying the dispersion to the depression in an amount just sufficient to fill the depression and thereby form a smooth surface on the photoconductive layer with the photoconductive dispersion filling but not overlapping the depression; and
d. drying the dispersion after its application to the depression to remove the solvent.

3,989,861

METHOD FOR COATING THE IMPACT SURFACE OF A GOLF CLUB HEAD

William P. Rasmussen, 1910 Coit Ave. NE., Grand Rapids, Mich. 49505

Division of Ser. No. 457,125, April 1, 1974, abandoned. This application Oct. 28, 1975, Ser. No. 625,860
Int. Cl.² B05D *1/00*
U.S. Cl. 427—180 **9 Claims**

1. A method of coating the impact surface of a golf club with a nonpermanent coating particularly suited to impart spin to a golf ball upon impact with the head, the method comprising: forming a mixture comprising abrasive particles and a soluble adhesive which is capable of being solubilized after drying in a common household solvent; applying the mixture as a liquid to the impact surface of a golf club head; and allowing the mixture to dry; thereafter, following use of the club, removing the coating with a common household solvent and reapplying the said mixture and allowing it to dry in preparation for reuse of the golf club.

3,989,862

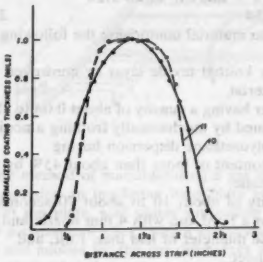
METHOD AND APPARATUS FOR VAPOR-DEPOSITING COATINGS ON SUBSTRATES

John Francis Butler, Bethel Park, and William John Babyak, Pittsburgh, both of Pa., assignors to Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 80,305, Oct. 13, 1970, abandoned. This application July 15, 1974, Ser. No. 488,373
Int. Cl.² C23C *11/00, 13/00*
U.S. Cl. 427—251 **5 Claims**

1. A process for coating a substrate comprising generating a vapor stream of coating material from a source of coating material, directing the vapor stream upwardly through a zone

of confinement, confining the stream transversely about its upward direction in said zone of confinement, passing the substrate over said zone of confinement immediately adjacent the top thereof, further confining said vapor stream at the top of said zone of confinement transversely of its upward direction and parallel to the direction of travel of the substrate while maintaining the width of the further confined vapor stream greater than the width of the substrate and more narrow than the width of the confined vapor stream prior to said further confinement to the extent that low velocity compo-



nents of the vapor stream do not condense on the substrate and thereby obtain a coating material thickness that is constant for a greater portion of its width than if the vapor stream were not further confined and a coating thickness profile characterized by a maximum deviation within ± 10% of its average coating weight, maintaining the distance between the source of coating material and the top of the zone of confinement at least about equal to the dimensional extent of the zone of confinement in the direction transverse to the direction of travel of the substrate, and condensing the further confined stream on said substrate.

3,989,863

SLURRY COATING PROCESS

Raymond P. Jackson, New York, N.Y.; Jonathan A. Travis, Oak Ridge, and Rodney B. Teel, Chatham, both of N.J., assignors to The International Nickel Company, Inc., New York, N.Y.

Filed July 9, 1975, Ser. No. 592,452
Int. Cl.² C23C *17/00*
U.S. Cl. 427—367 **9 Claims**

1. In a process of slurry coating at least a portion of the surface of a basis metal with a slurry containing metal particles and drying and sintering the metal of the slurry onto said basis metal wherein the basis metal has a melting point in excess of the sintering temperature of the metal in the slurry and the metal of the slurry is one which can be protected from oxidation by readily obtainable atmospheres, the improvement comprising employing as the slurry, metal powder dispersed in an aqueous phase containing silica in alkali-stabilized sol form with a mole ratio of silica to alkali metal of at least about 4, wherein silica is the predominate film forming ingredient and is present in an amount of about 0.8% to about 4% by weight of silica based upon the weight of the metal particles in the slurry.

3,989,864

PROCESS FOR APPLYING ABRASION RESISTANT PHOSPHATE COATING TO GLASS CONTAINER

David Gordon Hey, and Kevin Thomas McAloon, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Apr. 7, 1975, Ser. No. 565,703
Claims priority, application United Kingdom, Apr. 18, 1974, 17027/74
Int. Cl.² C03C *17/22, 17/32*
U.S. Cl. 427—407 A **7 Claims**

1. In a process for treating the surface of a glass container comprising applying a clear and transparent abrasion resistant coating to the surface of the container at an elevated temperature and thereafter applying to the surface of the container a lubricious organic cold-end coating, the improvement which comprises forming the abrasion resistant coating by applying to the surface of the container an aqueous solution of phosphoric acid containing from 0.5% to 10% by weight of phosphoric acid and less than 5% by weight of metal phosphate, the temperature of the surface of the container being at least 300° C.

3,989,865

TRANSPARENCY TREATED WITH ORGANIC AMINE

Richard A. Parent, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed June 5, 1974, Ser. No. 476,489
Int. Cl.² G03G *13/00*; B44D *1/092, 1/52*; G03G *13/14*
U.S. Cl. 427—430 R **3 Claims**

1. A method for chemically treating a transparency with a polysulfone, polycarbonate, or polyester thermoplastic film to render it useful as an imaging member in color xerography comprising:

a. applying a solution of an organic amine compound selected from the group consisting of methyl amine, ethylene diamine, ethanolamine, octylamine, diamino octane and salts and mixtures thereof to at least one surface of the film for a period of up to about 10 minutes at about 50° C; and

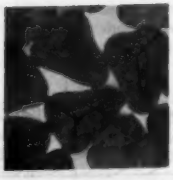
b. washing the surface of the film with a solvent for the amine compound.

3,989,866

ANTISOILING CARPET HAVING TRIANGULAR POLYAMIDE PILE CONTAINING POLYSTYRENE FIBRILS

Brewster B. Eskridge, and Boyce M. Lyon, both of Asheville, N.C., assignors to Akzona Incorporated, Asheville, N.C.

Division of Ser. No. 404,547, Oct. 9, 1973, Pat. No. 3,903,348.
This application June 6, 1975, Ser. No. 584,781
Int. Cl.² D02G *3/02, 3/04*; D04H *27/00*
U.S. Cl. 428—92 **7 Claims**



1. A carpet having enhanced ability to obscure soiling wherein yarn in the pile of the carpet is formed of synthetic linear polyamide fibers having a generally triangular cross-sectional area and having, on a weight basis, from about 0.1 to about 6% of an injection molding grade polystyrene dispersed

therein in the form of fibrils having a cross-sectional diameter of from about 1 to 4 microns.

3,989,867

ABSORPTIVE DEVICES HAVING POROUS BACKSHEET

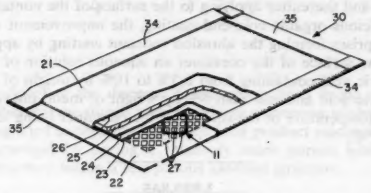
James Bryant Sisson, Hamilton, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 16, 1973, Ser. No. 333,110

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² A61F *13/18, 13/20;* A61L *15/03;* B32B *3/10*

U.S. Cl. 428—132 17 Claims



1. An absorptive device, comprising:

an absorbent body; and

a backsheet of a material having the characteristics of polyethylene film in direct contact with and substantially entirely underlying the absorbent body;

the backsheet having a plurality of tapered hollow bosses therein extending towards the absorbent body with each boss having an aperture extending through the apex thereof forming a tapered pore in the backsheet which enlarges in a direction away from the absorbent body;

the dimension of the pores being selected so that, when the absorptive device is placed to receive liquids such as discharges from a human body with the absorbent body positioned between the human body and the backsheet, the liquids absorbed by the absorbent body and contained within the absorptive device are blocked from passage through the backsheet while vapors pass readily through the pores of the backsheet.

3,989,868

TRANSMISSION BELTS

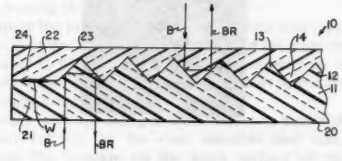
Richard Bell, Dumfries, Scotland; Takao Sato, Yamatokoriyama, Japan; Chitta R. Lahiri, Naugatuck, and Thomas G. Carver, Woodbridge, both of Conn., assignors to Uniroyal Limited, Newbridge, Scotland

Filed May 29, 1975, Ser. No. 582,031

Claims priority, application United Kingdom, May 21, 1974, 24217/74

Int. Cl.² B32B *3/00*

U.S. Cl. 428—161 13 Claims



1. A toothed power transmission belt comprising a body with transversely extending teeth along at least one of its faces and an inextensible tensile member embedded in said body, said body being made from a chlorosulphonated polyethylene compounded with not more than 15 parts by weight of acid acceptor per 100 parts by weight of chlorosulphonated polyethylene.

3,989,869

PROCESS FOR MAKING A POLYURETHANE FOAM SHEET AND COMPOSITES INCLUDING THE SHEET

Hermann Neumaier, Leichlingen; Klaus Noll, Cologne, both of Germany, and Helmut Reiff, New Martinsville, W. Va., assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 22, 1974, Ser. No. 499,754

Claims priority, application Germany, Aug. 28, 1973, 2343294

Int. Cl.² B32B *3/26*

U.S. Cl. 428—254 27 Claims

3. A composite material comprising the following adjacent layers;

a. a woven or knitted textile layer or nonwoven web of a fibrous material,

b. a foam layer having a density of about 0.04 to about 0.40 g/cm³ obtained by mechanically frothing a nonionogenic aqueous polyurethane dispersion having

i. a solids content of more than about 45% by weight of polyurethane,

ii. a viscosity of about 10 to about 70 seconds outflow time from a Ford cup with 4 mm nozzle and

iii. a particle diameter of less than 1.0μ, and

c. a plastics sheet.

3,989,870

PLASTIC SHEET ADHERED TO POLYURETHANE IONOMER LATEX FOAM

Paul J. Bocks, Viersen; Jurgen Grammel, Cologne, and Hermann Neumaier, Leichlingen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed June 25, 1973, Ser. No. 373,354

Claims priority, application Germany, June 27, 1972, 2231411

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.² B32B *3/26*

U.S. Cl. 428—315 7 Claims

1. A composite material comprising layers of

a. a plastic sheet with a weight per square meter or 20–300 g/m² and a tensile strength of at least 40 kg/cm² adhered to

b. a polyurethane ionomer latex foam having a gross density of 0.04 to 0.40 g/cm³ produced from aqueous air whipped ionomeric polyurethane dispersions which have

i. a solids content of 45 to 62 % by weight of polyurethane,

ii. a viscosity of 10 to 70 seconds outflow time from a Ford measuring cup with a 4 mm nozzle,

iii. a particle diameter of 0.05 to 1.0 μ

iv. an ionic group content of 3 to 40 milliequivalents per 100 g of polyurethane solids of ions selected from the group consisting of $\geq N^{\pm}$, $-COO^{-}$, $-SO_3^{-}$, and wherein R is hydrogen or a lower alkyl group, and

v. a tensile strength of at least 40 kg/cm² when dried to a homogeneous polyurethane foil,

and which contain

i. 1–10% by weight of a foam stabilizing agent, based on the weight of solid polyurethane,

ii. 0–100% by weight of inorganic fillers based on the weight of solid polyurethane,

iii. 0–30% by weight of crosslinking agent based on the weight of solid polyurethane, and

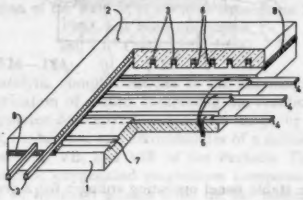
iv. 0.1 to 10% by weight of thickener based on the weight of solid polyurethane.

3,989,871

METHOD OF MANUFACTURING A GAS DISCHARGE PANEL AND GAS DISCHARGE PANEL MANUFACTURE ACCORDING TO SAID METHOD

Johannes Van Esdonk, and Johannes Petrus Hornman, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 29, 1974, Ser. No. 501,478
Claims priority, application Netherlands, Aug. 29, 1973, 7311860
Int. Cl.² B23P 3/00
U.S. Cl. 428—336 4 Claims



1. In the method of manufacturing a gas discharge display panel comprising an insulating base plate and an insulating transparent top plate, said plates supporting electrodes consisting of a chromium alloy, which electrodes constitute the cathodes and anodes for the gas discharges and which plates are assembled, while being heated to form a panel, the improvement comprising covering at least the parts of the cathodes operative for the gas discharge prior to assembling the panel with a layer of a metal selected from the group consisting of nickel, platinum and aluminum, said metal layer having a thickness sufficient to prevent the formation of chromium oxide during heating of the plates upon assembly of the panel.

3,989,872

PLASMA SPRAY POWDERS

Richard J. Ball, Hammond, Ind., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 19, 1974, Ser. No. 534,338
Int. Cl.² B32B 1/00; B05D 1/12
U.S. Cl. 428—404 1 Claim

1. Plasma spray powder which comprises a plurality of composite particles which consist essentially of an yttria stabilized zirconia core encased in a thin calcia shell.

3,989,873

FLUOROPOLYMER PRIMER COMPOSITIONS

Arthur B. Robertson, Succasunna; Robert J. Schaffhauser, Brookside; Elmer C. Lupton, Chatham, and William A. Miller, Somerville, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Mar. 27, 1975, Ser. No. 563,012
Int. Cl.² B32B 27/32, 27/30
U.S. Cl. 428—422 16 Claims

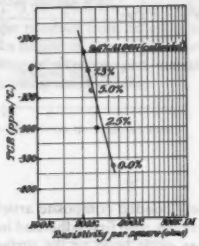
1. An article of manufacture which comprises a substrate, a primer coating fused thereon and comprising a copolymer of about 40 to 60 mol percent of ethylene, about 60 to 40 mol percent of a halogenated comonomer selected from the group consisting of tetrafluoroethylene, chlorotrifluoroethylene and mixtures thereof and 0 to 10 mol percent of an additional monomer selected from the group consisting of 3,3,3-trifluoro-2-trifluoromethyl propene, a vinyl monomer which is free of telogenic activity and which provides a side chain having at least two carbon atoms, said side chain being aromatic or having its elements bonded together by a single bond only, or mixtures thereof, and containing from about 1 to about 40 percent by weight of an oxide of cobalt, nickel, manganese, chromium, tin, molybdenum, tungsten or mixtures thereof, and an outer coating fused to said primer coating and comprising a copolymer of about 40 to 60 mol percent ethylene, about 60 to 40 mol percent of a halogenated comonomer selected from the group consisting of tetrafluoroethylene, chlorotrifluoroethylene and mixtures thereof and 0 to 10 mol percent of an additional monomer selected from the group consisting of 3,3,3-trifluoro-2-trifluoromethyl propene, a vinyl monomer which is free of telogenic activity and which provides a side chain having at least two carbon atoms, said side chain being aromatic or having its elements bonded together by a single bond only, or mixtures thereof.

3,989,874

RESISTANCE MATERIAL WITH COLLOIDAL ALOOH

John P. Maher, Adams, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Filed Jan. 23, 1975, Ser. No. 543,402
Int. Cl.² B32B 15/00; B05D 5/12
U.S. Cl. 428—432 11 Claims



1. In a resistance material having an electrically conductive component selected from a noble metal and a noble metal oxide, the improvement comprising the addition therein of colloidal alumina particles having been introduced in the form of colloidal aluminum oxide hydroxide particles, and being uniformly dispersed in said material for the purpose of making the temperature coefficient of resistance more positive, the weight percent of said alumina particles that are present in said resistance material being no less than 0.04% and no more than that required to cause the sheet resistivity of said resistance material to exceed about 17 megohms per square.

7. In a method for making a layer of resistance material including preparing a resistor ink containing an electrically conductive precursor component selected from a noble metal and a noble metal oxide, applying a layer of said ink to a substrate and firing said ink; the improvement comprising uniformly dispersing in said ink colloidal particles of aluminum oxide hydroxide for the purpose of making the temperature coefficient of resistance of said fired resistance material more positive, the amount of said aluminum oxide hydroxide in weight percent of the combined weight of said alumina and said metal in said ink, being no less than 0.1% and no more than that required to cause the sheet resistivity of said fired resistance material to exceed about 17 megohms per square.

3,989,875

MICA BASED ELECTRICAL INSULATION

Francis Derrick Bayles, Montreal, and Michael Alan Dudley, Beaconsfield, both of Canada, assignors to Canada Wire and Cable Limited, Toronto, Canada

Filed July 15, 1974, Ser. No. 488,408
Claims priority, application Canada, June 21, 1974, 203081
Int. Cl.² B32B 9/04
U.S. Cl. 428—447 7 Claims

1. A mica based composite comprising a reconstituted micaceous sheet impregnated with an impregnant off the family of poly (carborane siloxane) containing carborane moieties linked by siloxy groups at approximately 2 to 25% by

weight of impregnant based on the total weight of impregnated mica.

3,989,876

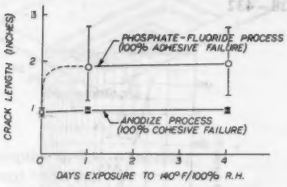
METHOD OF ANODIZING TITANIUM TO PROMOTE ADHESION

Yukimori Moji, Bainbridge Island, and J. Arthur Marceau, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Division of Ser. No. 424,792, Dec. 14, 1973, Pat. No. 3,959,091. This application May 27, 1975, Ser. No. 581,208

Int. Cl.[2] C25D *5/00;* **B32B** *15/04*

U.S. Cl. 428—472 **33 Claims**


CRACK LENGTH (INCHES)
PHOSPHATE-FLUORIDE PROCESS (100% ADHESIVE FAILURE)
ANODIZE PROCESS (100% COHESIVE FAILURE)
DAYS EXPOSURE TO 140°F/100% R.H.

1. An adhesively bonded composite article comprising first and second adherends, said first adherend including a titanium element having an oxide layer on the surface thereof; and an adhesive system bonded to said oxide layer and to said second adherend, said oxide layer having been produced by anodizing said surface of said titanium element in an aqueous solution comprising fluoride ions and an oxidizing electrolyte, the pH of said solution being less than 6, the anodizing potential being from about 5 to about 40 volts, and the fluoride ion concentration being such as to result in a current density of from about 0.25 to about 5 amperes per square foot.

18. In a process for manufacturing an adhesively bonded titanium structure the improvement wherein the titanium elements to be bonded together are anodized in an aqueous solution comprising fluoride ions and an oxidizing electrolyte, the pH of said solution being less than 6, the anodizing potential being from about 5 to about 40 volts, and the fluoride concentration being such as to result in a current density of from about 0.25 to 5 amperes per square foot, whereby a porous, adhesion-promoting oxide coating is formed on said elements.

3,989,877

GAS DISCHARGE DEVICE HAVING IMPROVED OPERATING CHARACTERISTICS

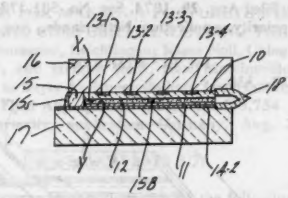
Roger E. Ernsthausen, Luckey, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 200,674, Nov. 22, 1971, abandoned, which is a continuation-in-part of Ser. No. 70,475, Sept. 8, 1970, Pat. No. 3,634,719. This application Oct. 12, 1973, Ser. No. 406,021

Int. Cl.[2] H01J *61/30, 65/04*

U.S. Cl. 428—539 **14 Claims**

1. In a gaseous discharge panel comprising an ionizable gaseous medium in a gas chamber formed by a pair of opposed dielectric material charge storage surfaces backed by electrode members, the electrode members behind each dielectric material surface being oriented with respect to the electrode material members behind the opposing dielectric material surface so as to define a plurality of discharge units, the improvement wherein at least one inorganic oxide compound containing lead and at least one other metal is applied to each opposed dielectric material surface in an amount sufficient to substantially decrease the required panel aging cycle time and



to provide stable panel operating voltages for a given period of panel operating time.

3,989,878

CATALYST AND PROCESS OF PRODUCTION OF POLYETHYLENE

Itsuho Aishima, Fujisawashi; Hisaya Sakurai, Kurashikishi; Yukichi Takashi, Kurashikishi; Hideo Morita, Kurashikishi; Tadashi Ikegami, Kurashikishi, and Toshio Sato, Kurashikishi, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 21, 1975, Ser. No. 579,752

Claims priority, application Japan, May 25, 1974, 49-58377; Feb. 24, 1975, 50-21876

Int. Cl.[2] C08F *4/66, 10/02*

U.S. Cl. 526—116 **15 Claims**

1. A process for polymerizing ethylene or a mixture of ethylene and another olefin which comprises polymerizing ethylene or a mixture of ethylene and another olefin in the presence of a catalyst prepared by reacting (A) a hydrocarbon-insoluble reaction product formed by the reaction of either (i) an organomagnesium-containing hydrocarbon-soluble complex represented by the general formula $MgX_pY_qR^1_rR^2_s$ (wherein M is *a* zinc or boron atom, R^1 and R^2 are hydrogen or the same or different hydrocarbon radicals each having 1 – 10 carbon atoms, X and Y are the same or different groups OR^3 or $OSiR^4R^5R^6$, R^3 is a hydrocarbon radical having 1 – 10 carbon atoms, R^4, R^5 and R^6 are hydrogen or the same or different hydrocarbon radicals each having 1 – 10 carbon atoms, α and β are each at least one, and β/α is 1 – 10, p, q, r, s are each 0 or greater than 0 and have a relation of $p+q+r+s=m\alpha+2\beta$, and $(p+q)/(\alpha+\beta)$ is 0.8 and m is the valence of M), or of a reaction product of (i) with (ii) a linear or cyclic siloxane compound having a constitutional unit represented by the general formula

(wherein R^7 and R^8 are hydrogen or the same or different hydrocarbon radicals each having 1 – 10 carbon atoms), with (iii) at least one titanium or vanadium compound containing 1 – 4 halogen atoms; with (B) an organoaluminum compound having the general formula $AlR^9_nZ_{3-n}$ (wherein R^9 is a hydrocarbon radical having 1 – 20 carbon atoms, Z is a member selected from the group consisting of hydrogen, halogen, alkoxy, aryloxy and siloxy radicals and n is a number from 2 – 3).

3,989,879

PROCESS AND CATALYSTS FOR THE POLYMERIZATION AND COPOLYMERIZATION OF OLEFINS

Eugene Berger; Andre Delbouille, both of Brussels; Pol Gerard, Braine-l'Alleud, and Jean-Louis Derroitte, Brussels, all of Belgium, assignors to Solvay & Cie, Belgium

Continuation-in-part of Ser. No. 118,998, Feb. 25, 1971, abandoned, which is a continuation of Ser. No. 676,738, Oct. 20, 1967, abandoned. This application July 10, 1972, Ser. No. 270,007

Claims priority, application France, July 21, 1971, 71.26788

The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.

Int. Cl.[2] C08F *4/02*, *10/02*

U.S. Cl. 526—124 28 Claims

1. A catalytic complex for use in the polymerization and copolymerization of olefins comprising the reaction product of a halogenated derivative selected from the group consisting of halides, oxyhalides, and alkoxyhalides of a transition metal of Groups IVB, VB, and VIB of the Periodic Table and a chelate organic oxygenated magnesium compound substantially free of hydroxyl groups fixed on the magnesium and having in their molecule at least one sequence of normal bonds of the magnesium - oxygen - carbon type and at least one coordination bond with the magnesium atom, in such a manner as to form a heterocycle in which the magnesium atom is included, said reaction product having a halogen/transition metal atomic ratio higher than its value in the starting halogenated derivative and a halogen/magnesium atomic ratio greater than 0.5.

3,989,880

CATALYST AND PROCESS FOR THE POLYMERIZATION OF OLEFINS

Eugene Berger, Brussels; Pol Gerard, Braine-l'Alleud; Andre Delbouille, and Jean-Louis Derroitte, both of Brussels, all of Belgium, assignors to Solvay & Cie, Belgium

Continuation-in-part of Ser. No. 118,998, Feb. 25, 1971, which is a continuation of Ser. No. 676,738, Oct. 20, 1967, abandoned. This application Feb. 11, 1972, Ser. No. 225,651

Claims priority, application France, Feb. 18, 1971, 71.05656

The portion of the term of this patent subsequent to Nov. 2, 1993, has been disclaimed.

Int. Cl.[2] C08F *4/02*, *10/02*

U.S. Cl. 526—124 9 Claims

1. A process for the polymerization and copolymerization of α-olefins which comprises conducting the polymerization or copolymerization in the presence of a catalyst composition comprising:

A. the reaction product of (1) a solid organic compound of a divalent metal containing at least one metal to oxygen to nitrogen bond and being substantially free from hydroxyl groups attached to the divalent metal, and (2) a halogenated derivative selected from the group consisting of halides, oxyhalides and alkoxyhalides of a transition metal of Groups IVB, VB and VIB of the Periodic Table; and

B. an organometallic compound having a metal selected from Groups IA, IIA, IIB, IIIA, and IVA of the Periodic Table wherein said reaction product has a halogen/transition metal ratio greater than 4 and an atomic ratio of halogen/divalent metal greater than 0.5.

3,989,881

CATALYST AND PROCESS FOR POLYMERIZATION OF OLEFIN

Kazuo Yamaguchi, Fujisawa; Natsuki Kanoh, Sagamihara; Toru Tanaka, Komae; Nobuo Enokido, Yokohama; Atsushi Murakami, Machida, and Seiji Yoshida, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Apr. 4, 1975, Ser. No. 565,196

Claims priority, application Japan, Apr. 8, 1974, 49-39736; Apr. 8, 1974, 49-39737; June 4, 1974, 49-63087

Int. Cl.[2] C08F *4/02*, *10/02*

U.S. Cl. 526—125 19 Claims

1. A solid catalytic complex for the polymerization of an olefin of the formula:

$$[Mg_nM_{1-n}]X_m \cdot xY$$

wherein M represents a transition metal selected from the group consisting of titanium and vanadium; X represents a halogen atom; Y represents an aliphatic ether or a cyclic ether; n is 0.01 – 0.99, $2<m<4$, and $1<x<3$, prepared by co-precipitating the product from an ether solution of (1) an ether complex of a halide of a transition metal selected from the group consisting of titanium and vanadium, and (2) an ether complex of a magnesium halide.

3,989,882

PROCESS FOR PREPARING AN ALTERNATING COPOLYMER OF A CONJUGATED VINYL COMPOUND AND AN OLEFINIC UNSATURATED COMPOUND

Kohei Nakaguchi, Osaka; Shohachi Kawasumi, Kobe; Masaaki Hirooka, Ibaraki; Hiroshi Yabuuchi, Takatsuki, and Hiroyoshi Takao, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

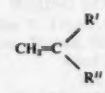
Division of Ser. No. 320,909, Jan. 4, 1973, Pat. No. 3,894,997, which is a continuation-in-part of Ser. No. 3,559, Jan. 9, 1970, abandoned, which is a continuation of Ser. No. 560,857, June 27, 1966, abandoned. This application Jan. 9, 1975, Ser. No. 539,911

Claims priority, application Japan, June 30, 1965, 40-39488; July 10, 1965, 40-41590

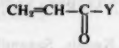
Int. Cl.[2] C08F *28/00*

U.S. Cl. 526—188 15 Claims

1. In a process for preparing an alternating copolymer by copolymerizing an olefinic unsaturated compound having the formula,



wherein R^I and R^{II} are independently hydrogen, a halogen atom, a hydrocarbon radical having 1 to 20 carbon atoms, or a halogen-containing hydrocarbon radical having 1 to 20 carbon atoms, and a conjugated vinyl compound selected from the group consisting of acrylonitrile and compounds having the formula,



wherein Y is a member selected from the group consisting of Z'R, $-Z'-_k$ Me', NR'R'' and R groups, and halogen and hydrogen atoms; Z' is an oxygen or sulfur atom; R is a hydrocarbon or halohydrocarbon radical having 1 to 20 carbon atoms; R' and R'' are the same or different groups selected from the group consisting of hydrogen atom and a hydrocarbon or halohydrocarbon radical having 1 to 20 carbon atoms, and may be bonded to each other at a place other than nitrogen; and Me' is an element from Groups I to II of the Mendeleev Periodic Table, wherein k is equal to the valency of Me', or an ammonium group with a catalyst at a temperature of $-150°$ C to $+100°$ C, the improvement which comprises effecting the copolymerization by contacting the monomers with a catalyst mixture obtained by contacting (a') at least one organometallic compound having the formula,

$$MR'_nX''_{p-n}$$

wherein M is a metal from Groups IIb, IIIb and IVb of Mendeleev's Periodic Table, R' is a hydrocarbon group having 1 to 20 carbon atoms, X'' is a halogen atom, p is the valency of the metal and n is an arbitrary value of 1 to p; with (b') at least one halogeno-compound having the formula,

$$M''X'''_mR''_{q-m}$$

wherein M'' is a metal from Groups IIIb and IVb of Mendeleev's Periodic Table, X''' is a halogen atom, R'' is a hydrocarbon radical having 1 to 20 carbon atoms, q is the valency of the metal, and m is an arbitrary value of 1 to q, in the presence of at least the conjugated vinyl compound, wherein at least one metal component (a') and (b') is aluminum or boron and the metal components (a') and (b') are different from each other, said catalyst being used in an amount of from 0.0005 to 10 moles per mole of said conjugated vinyl compound and said components (a') and (b') being present in a molar ratio of 1:100 to 100:1.

ELECTRICAL

3,989,883
FURNACE INSTALLATION OPERATED BY DIRECT ELECTRICAL HEATING ACCORDING TO THE RESISTANCE PRINCIPLE, IN PARTICULAR FOR THE PREPARATION OF SILICON CARBIDE

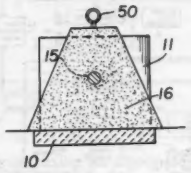
Gunter Wiebke, Munich; Ludwig Korndorfer, Aising; Eugen Korndorfer, Heiligblut; Andreas Korsten, Balkhausen; Theodor Benecke, and Fritz Petersen, both of Grefrath, all of Germany, assignors to Elektroschmelzwerk Kempten GmbH, Munich, Germany

Filed Dec. 10, 1974, Ser. No. 531,221

Claims priority, application Germany, Dec. 21, 1973, 2364108; Dec. 21, 1973, 2364106

Int. Cl.² H05B *3/60*

U.S. Cl. 13—23 **2 Claims**



1. In an electrical resistance furnace operated by direct electric heating operation, the current being supplied by means of electrodes through a resistance core that is introduced in a reacting burden; the improvement wherein said furnace has no side walls and is a stationary outdoor furnace, comprising means for keeping the surface of the burden moist during the heating cycle of the furnace the cooling phase and the dismounting.

3,989,884
INTERNALLY COOLED HIGH-ENERGY CABLE AND A METHOD OF MANUFACTURING SAME

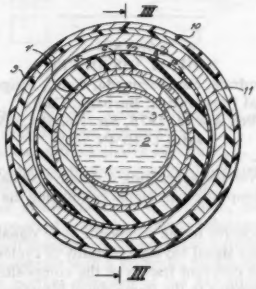
Jurgen Friedrich; Engelbert Friesenhagen, and Werner Rasquin, all of Cologne, Germany, assignors to Felten & Guilleaume Carlswerk AG, Cologne-Mulheim, Germany

Filed Jan. 29, 1975, Ser. No. 545,036

Claims priority, application Germany, Aug. 2, 1974, 2437279

Int. Cl.² H01B *7/34*

U.S. Cl. 174—15 C **16 Claims**



1. An elongated internally cooled high-voltage high-energy cable, comprising a corrosion resistant inner tubular member which defines a cooling channel for a cooling medium and is impermeable to the latter; an electric conductor including a circumferentially complete outer tubular member which surrounds said inner tubular member and is impermeable to the cooling medium, said tubular members defining between themselves at least one passage extending longitudinally of the cable and operative for conducting leakage cooling medium which penetrates through said inner tubular member in the event of rupture thereof to a predetermined located to thereby indicate the occurrence of the rupture; an electric insulation surrounding said electric conductor and separated from the leakage cooling medium by said tubular conductor element, and a cable jacket surrounding said electric insulation.

3,989,885
SUPPORT BODY FOR THE CONDUCTORS OF A LOW-TEMPERATURE CABLE

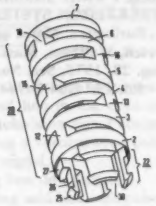
Peter Penczynski, Erlangen; Günther Matthäus, Spardorf, and Peter Massek, Forchheim, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed May 21, 1975, Ser. No. 579,543

Claims priority, application Germany, May 31, 1974, 2426422

Int. Cl.² H01B *12/00, 7/34*

U.S. Cl. 174—15 S **13 Claims**



1. In an electrical cable to be operated at low temperatures, an improved support body comprising:

a plurality of support elements arranged one behind the other along a given axis, each of said support elements including:

at least two support rings which enclose said axis and are arranged at predetermined spacings, one behind the other;

bridge members arranged parallel to said axis for rigidly connecting said support rings; and

at least one extension connected to the first one of said rings for engaging the last ring of the preceeding support element, said extension including means for limiting the degree with which said preceeding element can slide apart from the first one of said rings when said preceeding element is engaged by said extension.

3,989,886
WIRING DUCT COVER MOUNTING ASSEMBLY

Philip W. Taylor, Howell, Mich., assignor to Taylor Industries, Inc., Howell, Mich.

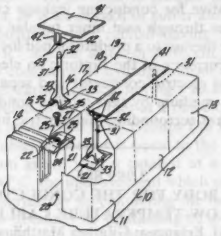
Filed June 5, 1975, Ser. No. 583,992

Int. Cl.² H05K *7/02;* **H02G** *3/02*

U.S. Cl. 174—135 **21 Claims**

1. An assembly for positioning a cover on a base comprising a clip having upper and lower surfaces, said clip being fastenable to said base with its lower surface in engagement with said base, said clip having a pair of spaced pin-mounting apertures with a latching lip on an edge of each of said apertures, and a pin with an end mounted on said clip through said pin-

mounting apertures, said end of said pin being of generally U-shaped with bifurcated extending legs each terminating in



a hook configuration for locking engagement with said latching lip.

3,989,887

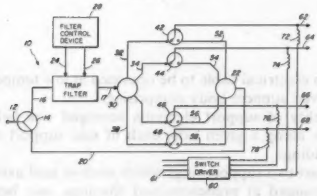
SWEPT FREQUENCY TRAP JAMMER FOR SECURE TELEVISION SYSTEM

William D. Murphy, Burlington, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Aug. 28, 1975, Ser. No. 608,429

Int. Cl.² H04N 1/44

U.S. Cl. 178—5.1 **21 Claims**



1. A jamming circuit for use in a secure cable television system of the type in which a television signal for a preselected channel is made unusable at a television receiver, comprising:

a. a tunable trap filter receiving the television signals and being adapted to be tuned to the carrier frequency of the preselected channel; and

b. means for cyclically tuning the trap filter to the carrier frequency of the preselected channel so that the television signal of the preselected channel is amplitude modulated and phase distorted in a manner related to the cyclic nature of the tuning, the tunable trap filter being a bridged T section filter having a pair of tunable high Q circuits and the cyclic tuning means having means for sweeping the first tunable circuit through the tuned condition at a first frequency and for sweeping the second tunable circuit through the tuned condition at a second frequency, the filter modulating the television signal at the first and second frequencies and at a frequency equal to the difference between the first and second frequencies.

3,989,888

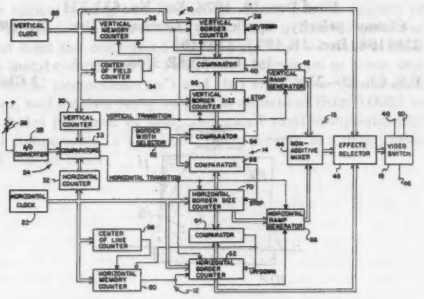
HORIZONTAL AND VERTICAL SOFT EDGE VIDEO TRANSITION SYSTEM WITH EDGE COMPRESSION

Albert E. Busch; John R. Hotsenpiller, both of Bloomington, and James V. Redding, Nashville, all of Ind., assignors to Sarkes Tarzian, Inc., Bloomington, Ind.

Filed Aug. 14, 1975, Ser. No. 604,621

Int. Cl.² H04N 5/22

U.S. Cl. 178—6.8 **36 Claims**



1. A soft edge transition system for use with a special effects generator providing a transition signal for rendering said transition system operative to switch one of first and second video input signals into a video output signal under the control of synchronizing signals, said transition system comprising:

means responsive to said transition signal for gradually switching said first video input signal out of said video output signal and switching said second video input signal into said video output signal, said switching means including means for determining the time duration of the transition between the initiation and completion of the gradual switching between said first and second video input signals;

means responsive to said synchronizing signals for determining the time interval between a predetermined datum and a predetermined point of the gradual switching by said switching means, said time interval determining means being operative to cause said transition duration determining means to alter the duration of the transition between said first and second video signals when said time interval reaches a predetermined duration.

3,989,889

DIGITAL DISSOLVER

James A. Mendrala, San Fernando, Calif., assignor to Sonex International Corporation, Burbank, Calif.

Filed Apr. 2, 1975, Ser. No. 564,319

Int. Cl.² H04N 5/38

U.S. Cl. 178—7.2 **29 Claims**

1. A dissolver for generating a dissolve signal in synchronism with a composite sync signal comprising the combination of:

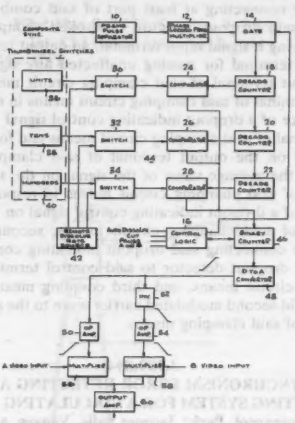
means responsive to the composite sync signal for generating a frame signal having a plurality of cycles corresponding to the different frames of the composite sync signal;

means responsive to the frame signal for generating a frame related signal in phase locked relation with the frame signal, the frame related signal being comprised of a succession of cycles defining a frequency which is a multiple of the frequency of the frame signal;

means responsive to the frame related signal for generating a separate pulse each time a predetermined number of

cycles of the frame related signal occurs; and

means responsive to the separate pulses for generating a



dissolve signal having an amplitude which is changed a selected amount in response to each separate pulse.

3,989,890

OPTICAL IMAGING SYSTEM UTILIZING A LIGHT VALVE ARRAY AND A COUPLED PHOTOEMISSIVE TARGET

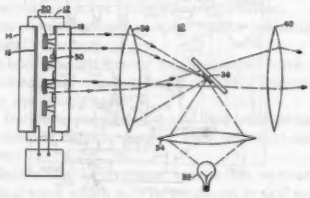
Harvey C. Nathanson, Pittsburgh, Pa.; Jens Guldberg, Hamburg, Germany, and Daniel R. Muss, Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 14, 1974, Ser. No. 442,970

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² H04N *3/16*

U.S. Cl. 178—7.3 D **7 Claims**



1. An optical imaging system comprising an evacuated hermetically sealed system comprising:

an input-radiation-transmissive substrate;

a imaging-radiation-transmissive substrate spaced from the input-radiation-transmissive substrate;

an array of electrostatically deflectable, reflective light valves supported upon the imaging substrate, which light valves each comprise a support post extending from the imaging substrate with a generally planar deflectable and reflective portion disposed at the extending end of the central support post;

an electrode grid disposed upon the imaging substrate between the spaced apart light valves;

a photoemissive means coupled between the input radiation transmissive substrate and the light valve array, with the input radiation being incident upon the photoemissive means to generate photoelectrons which produce a charge pattern upon the deflectable portions of the light valves, which charge pattern corresponds to the input radiation causing deflection of the light valve; and

output radiation imaging means for directing output radiation onto the light valve array through the imaging substrate, with the output radiation being reflected from the deflected light valves and passed through the imaging radiation transmissive substrate as a function of the input radiation.

3,989,891

LINE SELECTION CIRCUIT FOR A TELEVISION RECEIVER

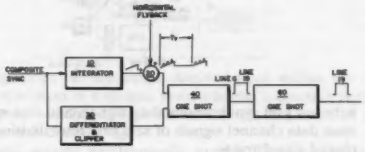
Harry T. Freestone, Portsmouth, Va., assignor to General Electric Company, Portsmouth, Va.

Filed Sept. 24, 1974, Ser. No. 508,817

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² H04N *5/44, 9/62*

U.S. Cl. 178—7.5 R **6 Claims**



1. A line selection circuit for a television receiver for identifying a predetermined line in the even and odd fields of a frame of a received television signal comprising:

means for extracting a vertical sync pulse from both fields of the television signal,

means for deriving line rate pulses,

means for combining said line rate pulses with the vertical sync pulses to derive a first signal of repetitive alternating even and odd field trigger pulses,

controllable timing means,

means coupling said first signal to said controllable timing means,

said controllable timing means being responsive to said first signal for initiating a timing period at the same line during both fields, the timing period of said controllable timing means being designed to terminate within said predetermined line, and

means for applying line rate pulses to said controllable timing means to effect a precise termination of the timing period corresponding to the beginning of said predetermined line and providing an output signal indicative of the beginning of said predetermined line.

3,989,892

LINE CONCENTRATOR FOR DEALING WITH ASYNCHRONOUS AND SYNCHRONOUS DATA SIGNALS IN A COMMON BIT FORMAT FOR A TIME DIVISION DATA SWITCHING EXCHANGE

Shinichiro Yoshida, Tokorozawa; Yoshitsugu Watanabe; Yuji Hayano, both of Tokyo; Susumu Ohara, Yokohama, and Takuhito Kojima, Kawasaki, all of Japan, assignors to Nippon Telegraph and Telephone Public Corporation; Nippon Electric Company, Ltd.; Oki Electric Industry Company, Ltd.; Hitachi, Ltd., all of Tokyo and Fujitsu Ltd., Kawasaki, all of, Japan

Filed July 3, 1975, Ser. No. 592,958

Claims priority, application Japan, July 4, 1974, 49-76757

Int. Cl.² H04L *5/22*

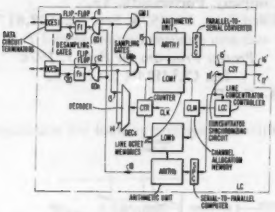
U.S. Cl. 178—50 **3 Claims**

1. A line concentrator for use between a highway for a time division data switching exchange and a plurality of asynchro-

nous and synchronous data terminals for asynchronous and synchronous data signals, each comprising a series of bits, said synchronous data signals having a common bit frequency, said line concentrator comprising:

first means responsive to a first set of timing pulse trains for effecting conversion between said asynchronous data signals and first asynchronous data channel signals of a first time division multiplexed signal train at a plurality of time positions in each bit of said asynchronous data signals,

second means responsive to a second set of timing pulse trains having a common repetition frequency of an integral multiple of said bit frequency and timed relative to said first set of timing pulse trains for effecting conversion



between said synchronous data signals and first synchronous data channel signals of said first time division multiplexed signal train,

third means for carrying out conversion between said first asynchronous and synchronous data channel signals and second asynchronous and synchronous data channel signals of a second time division multiplexed signal train, and

fourth means for transmitting said second time division multiplexed signal train between said third means and said highway, said second asynchronous and synchronous data channel signals having bit structures of a common and uninterleaved bit format of $(x+2)$-bit envelope, where x represents an integer.

3,989,893

REPRODUCING APPARATUS WITH DROP OUT SUPPRESSION CIRCUIT FOR AUDIO AND VIDEO SIGNALS

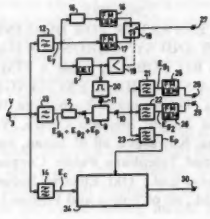
Hendrik Eisema, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 4, 1974, Ser. No. 529,338

Claims priority, application Netherlands, Sept. 13, 1974, 7412152

Int. Cl.² H04N *5/60*

U.S. Cl. 178—6.6 DC **7 Claims**



1. A dropout compensation apparatus for an apparatus for reading a disc-shaped record carrier optically encoded with a combined video signal containing a first carrier wave modulated with luminance information and a second carrier wave modulated with sound information, comprising a radiation sensitive detector means for converting radiation from said carrier into an electrical video signal, a dropout detector for providing a dropout indicator control signal, first coupling means for connecting at least part of said combined video signal to said dropout detector, controlled clamping circuit means having a signal input terminal, an output terminal and a control terminal for passing unaffected any signal on the signal input terminal of said clamping circuit means to the output terminal of said clamping circuit means in response to the absence of a dropout indicating control signal at the control terminal of said clamping circuit means and for clamping the signal on the output terminal of said clamping circuit means to the average value of the signal on the signal input terminal of said clamping circuit means in response to the presence of a dropout indicating control signal on the control terminal of said clamping circuit means, second coupling means for connecting said dropout indicating control signal from said dropout detector to said control terminal of said clamping circuit means, and third coupling means for connecting said second modulated carrier wave to the signal input terminal of said clamping means.

3,989,894

SYNCHRONISM ERROR DETECTING AND CORRECTING SYSTEM FOR A CIRCULATING MEMORY

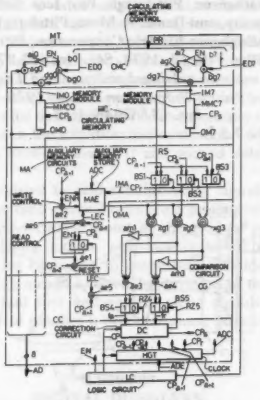
Pierre Charransol, Paris; Jacques Sallé, Vanves, and Jacques Becker, Paris, all of France, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Dec. 13, 1973, Ser. No. 424,298

Claims priority, application France, Dec. 21, 1972, 72.45697

Int. Cl.² H04L *7/00*

U.S. Cl. 178—69.5 R **3 Claims**

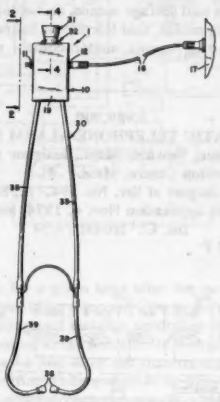


1. A synchronization correction system for a recirculating memory controlled by an address counter, comprising means for feeding a series of address control bits derived from said counter to said memory, an auxiliary memory, enabling means connected to receive said bits and responsive to said bits for feeding one of said bits for storage in said auxiliary memory at a time having predetermined timed relationship to the feeding of bits to said recirculating memory, means for reading out said one bit from said auxiliary memory at a predetermined time interval thereafter, comparison means for comparing the bit read out of said auxiliary memory with bits fed from said enabling means, correction control means responsive to the comparison of said bits for emitting a first signal when the compared bits are identical and emitting second signals when the compared bits are not identical, and means responsive to said second signals for correcting the timing of feeding of bits to said recirculating memory.

3,989,895
STETHOSCOPE TRANSDUCER

Philip S. O'Daniel, Sr., 1640 Ashland Ave., St. Paul, Minn. 55104

Filed May 8, 1974, Ser. No. 467,893
Int. Cl.² H04R 1/46; A61B 7/04
U.S. Cl. 179—1 ST 9 Claims



1. An improved stethoscope which allows its user to simultaneously monitor heart sounds using his ears while selectively detecting the heart sounds electrically and converting them into a meaningful electrical form for transmission to a receiving station, said improved stethoscope comprising:

a. mechanical sound pick-up means for producing a confined acoustical wave from a heart pulsation;

b. said mechanical sound pick-up means including a first acoustical chamber;

c. a conduit through which an acoustical wave may be transmitted, said conduit being operably communicable with an operator's ears;

d. a first bore-like passageway, said first passageway being in continuous communication with said first acoustical chamber;

e. electrical sound conversion means for converting an acoustical wave which may be produced in said acoustical chamber into an electrical signal, said electrical sound conversion means including:

i. housing apparatus;

ii. means for operably attaching said housing apparatus to the stethoscope;

iii. a microphone carried by said housing apparatus;

iv. said housing apparatus containing an acoustical duct;

v. means for retaining said microphone in sealed communication with said acoustical duct;

vi. power means for operating said microphone; and

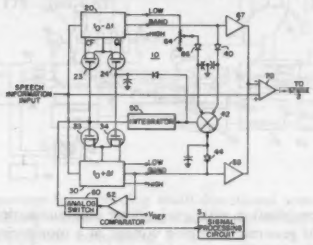
vii. an out-put terminal carried by said housing apparatus and being in communication with said microphone for distributing an electrical signal which may be produced by said microphone;

f. means for simultaneously interconnecting said conduit with said first passageway and said acoustical duct to allow heart sounds to be simultaneously transmitted mechanically to a listener's ears and to said microphone.

3,989,896
METHOD AND APPARATUS FOR SPEECH IDENTIFICATION

Heribert J. P. Reitboeck, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 8, 1973, Ser. No. 358,427
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² G10L 1/00
U.S. Cl. 179—1 SB 12 Claims



1. Apparatus for tracking a spectral peak within the frequency spectrum of a spoken word wherein a spectral peak is a frequency which corresponds to a peak amplitude in the spoken word, comprising:

first and second electronically tunable filter means connected to receive spoken words and produce an output signal having an adjustable center frequency and an adjustable Q characteristic, said first tunable filter means responding to the frequency content of spoken words occurring in a frequency range in a first direction from said center frequency and a second tunable filter means responding to the frequency content of spoken words occurring in the frequency range in an opposite direction, said first and second tunable filter means including control inputs to receive control input signals to adjust said center frequencies and said Q characteristics, and

feedback control means connected to the outputs of said first and second tunable filter means to determine the deviation of said center frequencies from a spectral peak in said spoken word and develop a control input signal to adjust said center frequencies to establish a predetermined relationship between said center frequencies and spectral peak.

3,989,897
METHOD AND APPARATUS FOR REDUCING NOISE CONTENT IN AUDIO SIGNALS

Robert W. Carver, 3520 NE. 135th, Seattle, Wash. 98115

Filed Oct. 25, 1974, Ser. No. 518,082
Int. Cl.² H04B 15/00
U.S. Cl. 179—1 P 8 Claims

1. A method of suppressing background noise in an audio frequency signal comprising the steps of:

producing an electrical control signal derived from said audio signal in which the frequency components of said control signal are continuously varied relative to the amplitudes of the corresponding frequency components of said audio signal as a function of the instantaneous amplitude verses frequency content of said audio signal;

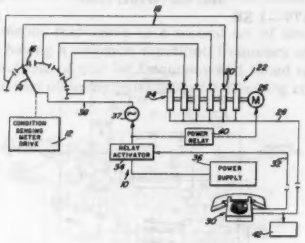
detecting a threshold presence of said frequency components of said control signal in each of a plurality of frequency bands; and

selectively passing frequency components of said audio signal falling within each of said plurality of frequency bands only when a threshold presence of said frequency components of said control signal have been detected within the corresponding frequency band.

3,989,898
REMOTE MONITOR SIGNALLING SYSTEM

Thomas J. Dugan, 2056 Meadowview, Springfield, Mo. 65804, and Ross M. Spencer, Route 2, Box 18, Willard, Mo. 65781

Filed Dec. 19, 1974, Ser. No. 534,216
Int. Cl.² H04M 11/00
U.S. Cl. 179—2 AM 16 Claims

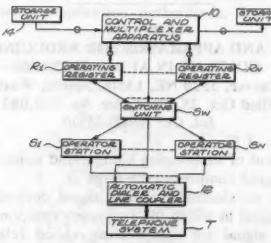


1. In combination with a telephone communication system adapted to generate a ringing voltage at a monitoring station in response to dialing thereof from a remote receiving station and a condition sensor at the monitoring station, data signalling apparatus for reporting conditions monitored by the condition sensor comprising a code generating assembly having a plurality of inputs and a common output pulse line through which the monitoring station is dialed, an oscillator generating a fixed frequency signal when energized, code selecting switch means connected to the oscillator for directly transmitting said signal to one of the inputs of the code generating assembly, drive means connecting the sensor to the switch means for selecting one of the inputs through which the signal is conducted, and relay means connected to the oscillator and the code generating assembly for simultaneously initiating operation thereof in response to said ringing voltage to transmit said signal through the common output line to the remote receiving station in the form of coded output pulses.

3,989,899
TELEPHONE SCHEDULING SYSTEM

Daniel Norwich, 350 N. Palm, Beverly Hills, Calif. 90210

Filed Apr. 8, 1975, Ser. No. 566,643
Int. Cl.² H04M 11/00
U.S. Cl. 179—2 DP 8 Claims



1. A telephone scheduling system for use in cooperation with a telephone network, comprising:

storage means for storing a plurality of data cells including data on individual telephone numbers identifying stations to be contacted along with representations of message information;

at least one operating station including a telephone instrument, cue manifesting means, register means for receiving signals from said storage means representative of said data cells, and means for supplying data cell signals representative of message information from said register means to said cue manifesting means;

an automatic dialing means coupled to said telephone network and connected to receive data cell signals representative of telephone numbers from said operating station register means, for dialing said stations to be contacted;

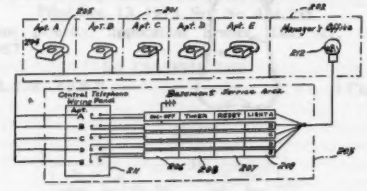
sensing means coupled to said telephone network for providing an answer signal to indicate contact with one of said stations to be contacted and an interrupt signal to indicate termination of telephonic contact; and

sequence control means for sequentially providing signals representative of said data cells from said storage means to said operating station register means, returning said data cells to said storage means, and actuating said automatic dialing means, said telephonic instrument, and said cue manifesting means, under control of said sensing means.

3,989,900
AUTOMATIC TELEPHONE ALARM SYSTEM

Andrew S. Dibner, Newton, Mass., assignor to Lifeline Systems, Inc., Newton Centre, Mass.

Continuation-in-part of Ser. No. 394,792, Sept. 6, 1973, abandoned. This application Nov. 4, 1974, Ser. No. 520,495
Int. Cl.² H04M 11/04
U.S. Cl. 179—5 P 1 Claim



1. A plurality of automatic alarm systems for use in conjunction with existing residential telephones, each telephone being located in one dwelling unit of a multiple dwelling, each automatic alarm system comprising a power source, a timer, a selectively operable switch between said power source and timer for placing the timer in a running or non-running condition, alarm means for transmitting a remote signal that help is needed at the dwelling unit, means responsive to the running of said timer for a predetermined time for activating said alarm means, reset means activatable to reset said running timer to zero and to deactivate said alarm means, and means responsive to activation of said telephone by a resident for activating at least said running timer reset means, the timer, reset means, means responsive to telephone activation and at least portions of said alarm means for all of said systems, being located at a central area of said multiple dwelling.

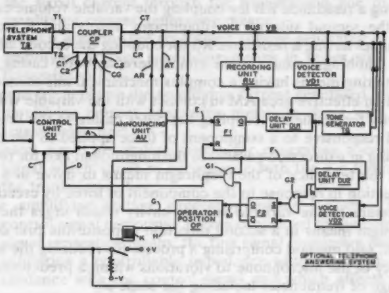
3,989,901
OPTIONAL TELEPHONE ANSWERING SYSTEM

Marvin R. Neuwirth, Syosset; Warren C. Hubbs, Bellport, and Edward A. Murphy, Dix Hills, all of N.Y., assignors to Message Center Systems, Inc., New York, N.Y.

Filed Apr. 30, 1975, Ser. No. 573,346
Int. Cl.² H04M 1/64
U.S. Cl. 179—6 E 4 Claims

1. A telephone answering apparatus connected to an answer service operator position so that an answer service operator can converse with a calling party, and to a subscriber's line in parallel with the subscriber's telephone instrument which receives ringing signals when called and receives voice and characteristic signals after a call has been established, said apparatus comprising ringing signal sensing means for generating an indicator signal when a given number of consecutive ringing signals occur on the subscriber's line within a given

period of time, announcing means activated by the occurrence of the indicator signal for transmitting an announcement and a first tone after the announcement to the subscriber's line, a message recording means connected to the subscriber's line for recording voice signal messages, means for activating said message recording means after the transmission of the first tone, means responsive to the absence of voice signals on the



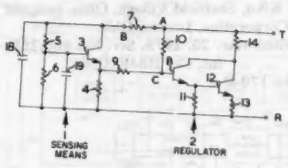
subscriber's line for a given time after the occurrence of the first tone for transmitting a second tone to the subscriber's line and for deactivating said message recording means, and sensing means responsive to the presence of a characteristic signal on the subscriber' s line after the occurrence of the second tone for transmitting calling signals to the answer service operator position to instruct the answer service operator to converse with a calling party.

3,989,902

ALTERNATING CURRENT REGULATOR FOR USE WITH TELEPHONE TYPE LINE

Michael C. J. Cowpland, Ottawa, Canada, assignor to Mitel Canada Limited, Canada

Filed Oct. 23, 1974, Ser. No. 517,375
Claims priority, application Canada, June 14, 1974, 202503
Int. Cl.² H04M *1/00*
U.S. Cl. 179—81 R **9 Claims**



1. A regulator for connection to a telephone type line for controlling AC impedance in shunt with the line, comprising:

a. sensing means for connection to said line which senses the level of direct current carried by the line; and

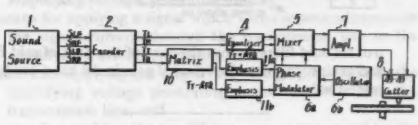
b. variable impedance means for connection in shunt with the line under control of said sensing means which provides a variable AC impedance inverse to the level of direct current sensed and a relatively constant D.C. impedance, said variable impedance means comprising a variable impedance device having an approximately constant high AC impedance when the direct current carried by said line is below a predetermined amplitude and an AC impedance which is inversely proportional to said direct current above the predetermined amplitude.

3,989,903

MULTI-DIRECTIONAL SOUND SIGNAL RECORDING AND/OR REPRODUCING SYSTEM WITH CROSSTALK COMPENSATION MEANS

Duane H. Cooper, W. Daniel St. 918, Champagne, Ill. 61820; Toshihiko Takagi, and Yoshihisa Kamo, both c/o Kawasaki Factory, Nippon Columbia Kabushikikaisha,, Minato, Kawasaki, Kanagawa, Japan

Filed May 9, 1974, Ser. No. 468,268
Claims priority, application Japan, May 10, 1973, 48-52077
Int. Cl.² G11B *3/74*
U.S. Cl. 179—100.4 ST **11 Claims**



1. Apparatus for recording multi-directional sound signals on a recording medium, as main channel signals and angularly modulated signals, comprising

means for supplying multi-directional sound source input signals,

encoding circuit means for providing first and second main channel signals and first and second subchannel signals from said input signals,

matrix circuit means for providing a subchannel sum signal of said subchannel signals and a subchannel difference signal of said subchannel signals such that said first and second subchannel signals are added in said sum signal and such that said second subchannel signal is subtracted from said first subchannel signal in said difference signal,

oscillator means for providing a carrier signal having a predetermined frequency,

modulator means for angularly modulating said carrier signal with said subchannel sum signal to provide a first angularly modulated subchannel signal, and

modulator means for angularly modulating said carrier signal with said subchannel difference signal to provide a second angularly modulated subchannel signal,

said matrix circuit means including means for decreasing the relative phase deviation between said first modulated subchannel signal and said second modulated subchannel signal by decreasing the amplitude, in said sum and difference signals, of said second subchannel signal with respect to said first subchannel signal,

mixing means for adding said first angularly modulated subchannel signal and said first main channel signal to provide a first recording signal for said recording medium,

mixing means for adding said second angularly modulated subchannel signal and said second main channel signal to provide a second recording signal for said recording medium, and

means for recording said first and second recording signals, respectively, on said recording medium.

3,989,904

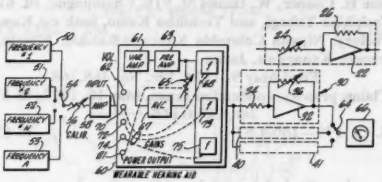
METHOD AND APPARATUS FOR SETTING AN AURAL PROSTHESIS TO PROVIDE SPECIFIC AUDITORY DEFICIENCY CORRECTIONS

John S. Rohrer, Tempe, and Vernon O. Blackledge, Scottsdale, both of Ariz., assignors to John L. Holmes, Scottsdale, Ariz.

Filed Dec. 30, 1974, Ser. No. 537,066
Int. Cl.² H04R *1/22, 25/00*
U.S. Cl. 179—107 FD **17 Claims**

16. The method of setting a specific auditory deficiency correction into an aural prosthesis of the type having at least one filter means providing an audio pass band and an adjustable gain control for said filter, the steps comprising:

measuring the gain required to provide a desired hearing discrimination within said pass band, providing the reciprocal of said measured gain and adjusting said gain control for said filter so that the sum of the gain of said filter and reciprocal of said measured gain in dB has a predetermined value.

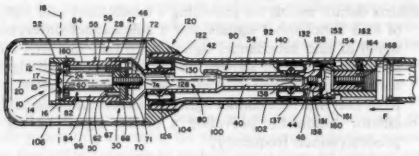


3,989,905

MICROPHONE

C. Roger Anderson, Wilmette; Eduard A. Rusch, Bloomingdale, and Charles E. Seeler, Evanston, all of Ill., assignors to Shure Brothers Inc., Evanston, Ill.

Filed Dec. 15, 1975, Ser. No. 640,580
Int. Cl.² H04R 1/02, 1/32
U.S. Cl. 179—121 R 15 Claims



1. A microphone comprising:

diaphragm means defining a center point, a first side and a second side for vibrating in response to sound waves striking at least the first side, said diaphragm means defining a longitudinal axis perpendicular to a plane tangent to the diaphragm means at the center point and passing through the center point;

transducer means for converting the vibration of the diaphragm means into corresponding electrical signals;

housing means for supporting the diaphragm means in relationship to the transducer means;

means for defining a variable volume cavity;

acoustical channel means for coupling the variable volume cavity to the second side of the diaphragm means so that the diaphragm means is moved in response to any pressure change in the cavity;

an outer casing;

mounting means having at least one adjustable characteristic for resiliently coupling the outer casing to the housing and responsive to a component of force applied to the outer casing in a direction parallel to the longitudinal axis for reducing the tendency of the diaphragm means to move in a first direction in response to the component force by creating a pressure in the cavity which urges the diaphragm means in a second direction opposite the first direction; and

adjustment means for adjusting each adjustable characteristic of the mounting means.

11. A method of balancing a unidirectional microphone comprising diaphragm means defining a center point, a first side and a second side having an effective area AD for vibrating in response to sound waves striking the first and second sides, said diaphragm means defining a longitudinal axis perpendicular to a plane tangent to the diaphragm means at the center point and passing through the center point; a voice coil having a mass MC suspended on the second side of the diaphragm; transducer means having a mass MT for converting the vibration of the diaphragm means and the voice coil into corresponding electrical signals, said transducer means including a housing for supporting the diaphragm means in relationship to the transducer means; acoustical network means having an acoustical impedance $Z2$ coupled to the second side of the diaphragm means, said acoustical network means comprising a variable volume cavity, a first channel havng a resistance RB for coupling the variable volume cavity to the second side of the diaphragm means and a second channel having a resistance RS for coupling the second side of the diaphragm means to the atmosphere; an outer casing; and mounting means having a complex mechanical impedance $Z1$ and an effective area AM in contact with the variable volume cavity for resiliently coupling the outer casing to the housing and responsive to a component of force applied to the outer casing in a direction parallel to the longitudinal axis for reducing the tendency of the diaphragm means to move in a first direction in response to the component of force by creating a pressure in the variable volume cavity which urges the diaphragm means in a second direction opposite the first direction, said method comprising a process for reducing the sensitivity of the microphone to vibrations within a predetermined range of frequencies including the steps of:

designing the microphone component values to as nearly as possible satisfy the equation:

$$1+\frac{MT}{MC}=\left(1+\frac{Z1}{(AM)^2(Z2)}\right)\left(1+\frac{RS}{RB}\right)\left(\frac{AM}{AD}\right)\text{; and}$$

adjusting impedance $Z1$ relative to impedance $(AM)^2(Z2)$ so that the ratio

$$\frac{Z1}{(AM)^2(Z2)}$$

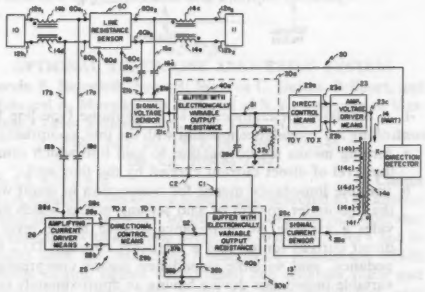
remains as nearly constant as possible over the predetermined range of frequencies and so that the phase angle of impedance $Z1$ and the phase angle of impedance $(AM)^2(Z2)$ are as nearly equal as possible, whereby the microphone becomes less sensitive to shock forces applied to the outer casing parallel to the longitudinal axis.

3,989,906

REPEATER FOR TRANSMISSION LINES

Frederick J. Kiko, Sheffield Village, Ohio, assignor to Lorain Products Corporation, Lorain, Ohio

Filed Mar. 20, 1975, Ser. No. 560,258
Int. Cl.² H04B 3/36
U.S. Cl. 179—170 R 14 Claims



1. In an apparatus for modifying the transmission characteristics of a telephone transmission line or the like, the combination of:

amplifying voltage generating means for generating an amplifying voltage for application to the transmission line;

amplifying current generating means for generating an amplifying current for application to the transmission line;

means for applying a signal which varies in accordance with the signal voltage across the transmission line to the amplifying voltage generating means;

means for applying a signal which varies in accordance with the signal current through the transmission line to the amplifying current generating means;

means for applying the amplifying voltage generated by the amplifying voltage generating means in series with the transmission line;

means for applying the amplifying current generated by the amplifying current generating means in shunt with the transmission line;

control signal generating means for generating a control signal which varies in accordance with the a-c losses of the transmission line;

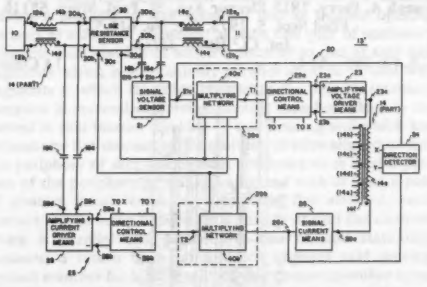
the amplifying voltage generating means including first control signal responsive means connected to the control signal generating means, the first signal responsive means exhibiting a controllable impedance which varies in accordance with the control signal and which affects the generation of the amplifying voltage so as to cause the ratio of the amplifying voltage to the signal voltage across the transmission line to vary in accordance with the a-c losses of the transmission line; and

the amplifying current generating means including second control signal responsive means connected to the control signal generating means, the second signal responsive means exhibiting a controllable impedance which varies in accordance with the control signal and which affects the generation of the amplifying current so as to cause the ratio of the amplifying current to the signal current through the transmission line to vary in accordance with the a-c losses of the transmission line.

3,989,907
REPEATER FOR TRANSMISSION LINES OF DIFFERING LENGTHS

Charles W. Chambers, Jr., Amherst, Ohio, assignor to Lorain Products Corporation, Lorain, Ohio

Filed Mar. 20, 1975, Ser. No. 560,257
Int. Cl.² H04B 3/36
U.S. Cl. 179—170 R **8 Claims**



1. In an apparatus for modifying the transmission characteristics of a telephone transmission line or the like, the combination of:

means for generating a control signal proportional to the a-c losses of the transmission line;

amplifying voltage generating means for generating an amplifying voltage in aiding relationship to the signal voltage across the transmission line, the amplifying voltage generating means including first control signal responsive means for establishing a signal dependent upon the product of the control signal and the signal voltage, the magnitude of the amplifying voltage varying in accordance with said product;

amplifying current generating means for generating an amplifying current in aiding relationship to the signal current through the transmission line, the amplifying current generating means including second control signal responsive means for establishing a signal dependent upon the product of the control signal and the signal current, the magnitude of the amplifying current varying in accordance with said product;

means for applying a signal which varies in accordance with the signal voltage across the transmission line to the amplifying voltage generating means;

means for applying a signal which varies in accordance with the signal current through the transmission line to the amplifying current generating means;

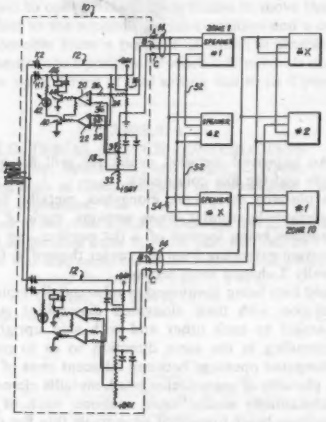
means for applying the amplifying voltage generated by the amplifying voltage generating means in series with the transmission line; and

means for applying the amplifying current generated by the amplifying current generating means in shunt with the transmission line.

3,989,908
SPEAKER SUPERVISION IN A PUBLIC ADDRESS SYSTEM

Ignas Budrys, Bethel, and Robert W. Right, Huntington, both of Conn., assignors to General Signal Corporation, Rochester, N.Y.

Filed June 26, 1975, Ser. No. 590,654
Int. Cl.² H04R 29/00
U.S. Cl. 179—175.1 A **8 Claims**



1. Apparatus for supervising a public address system such that any faults on the lines connected to speakers in the system or any faults within the speaker structures can be detected, comprising

a central station;

groups of speakers in each of a plurality of zones;

a supervision means for each zone to be supervised, including connections by way of a three-line transmission path to the group of speakers in a respective zone;

said supervision means including a first comparator connected to said transmission path and responsive at its input to substantial changes in the impedance of said transmission path, due to an open circuit condition, to indicate such condition;

a relay having contacts in two of said lines;

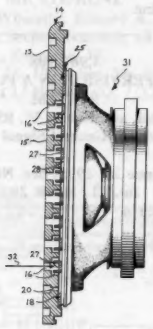
a second comparator connected to said transmission path and responsive at its input to substantial changes in the impedance of said transmission path, due to a short circuit condition, the second comparator being operative to open said relay contacts so as to present an open condition, whereupon the first comparator is responsive to each open condition.

3,989,909

GRILL FOR AUDIO LOUDSPEAKERS AND THE LIKE

Roy F. Hodsdon; Friedrich H. Mann, and Henry A. Schaefer, all of Lynchburg, Va., assignors to General Electric Company, Lynchburg, Va.

Filed Sept. 15, 1975, Ser. No. 613,624
Int. Cl.² H04R *1/02*
U.S. Cl. 179—184 **10 Claims**



1. An improved metallic, protective grill for audio loudspeakers and the like comprising:

a. a plurality of spaced, elongated, metallic bars having substantially similar cross sections, each of said cross sections being formed of a flat portion and an upright portion extending from the center thereof to form a generally T-shaped cross section;

b. said bars being positioned in substantially equally spaced relation with their elongated dimensions substantially parallel to each other and with said upright portions extending in the same direction so as to provide first elongated openings between adjacent ones of said bars;

c. a plurality of spaced, elongated, metallic elements having substantially similar cross sections, each of said cross sections being formed of a relatively thin flat portion and a relatively thin upright portion extending in the same direction from each elongated edge thereof to form a generally U-shaped cross section;

d. said elements being positioned in substantially equally spaced relation with their elongated dimensions substantially parallel to each other, and with said flat portions spaced similarly to spacings of said T-shaped cross sections so as to provide second elongated openings between adjacent ones of said flat portions;

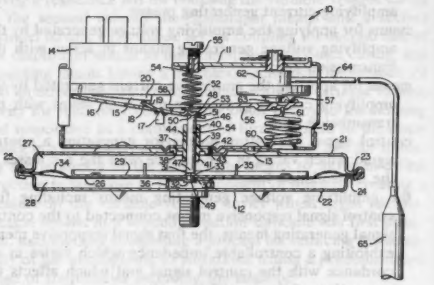
e. and means mounting said bars and said mounted elements together so that one of said U-shaped cross-sections is positioned between but spaced from adjacent pairs of said T-shaped cross-sections, and thereby form an acoustically operable but mechanically protected grill for a loudspeaker.

3,989,910

CONTROL DEVICE AND METHOD OF MAKING THE SAME

William J. Russell, Milford; Khiman K. Pursnani, Bridgeport, and Rolf H. Ochsner, Trumbull, all of Conn., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Apr. 7, 1975, Ser. No. 565,615
Int. Cl.² H01H *35/34*
U.S. Cl. 200—83 A **9 Claims**



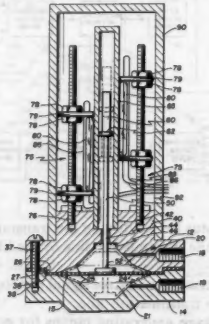
1. In a control device having an actuator housing and a differential pressure responsive housing secured together so that a certain change in differential pressure in said pressure housing will cause a part thereof to move to a certain new position therein and cause lever means in said actuator housing to operate an actuator therein, the improvement comprising a tubular bearing member disposed between said housings and being carried by said pressure housing, said housings having aligned openings respectively receiving opposed ends of said tubular member whereby said opposed ends respectively project into said housings, said tubular member closing said openings of said housings, and an actuating pin telescoped in said tubular bearing member and having opposed ends extending from said tubular bearing member and engaging said movable part and said lever means to translate motion therebetween, said tubular bearing member being in fluid communication with said pressure housing and thereby providing a fluid bearing for said actuating pin.

3,989,911

MAGNETIC DIFFERENTIAL PRESSURE SWITCH

Joseph A. Perry, 1815 Eleanor Ave., St. Paul, Minn. 55116

Filed Sept. 5, 1975, Ser. No. 610,523
Int. Cl.² H01H *35/34*
U.S. Cl. 200—83 L **14 Claims**



1. A differential pressure switch comprising, an actuator body, an internal recess in said body, a diaphram positioned in said body and stretched across said internal recess to define

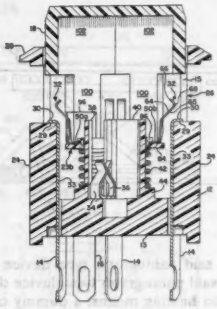
two symmetrical chambers conically shaped in form when said diaphram is in a neutral position, a pair of ports extending through said body and communicating respectively with said chambers, said diaphram being made of an elastic material such as to stretch and be displaced to opposite ends of said recesses with variation in differential pressure applied to said chambers through said ports, a shaft having a flat head at one end positioned in one of said chambers and extending through an opening in said body with the flat head bearing against said diaphram, a tube member surrounding said shaft and sealed to said body around said opening, a permanent magnet mounted on the end of the shaft within the tube and opposite the flat head, ajustable mounting means mounted on the body and positioned adjacent said tube, and magnetically operated controller means mounted in said mounting means and operable through magnetic flux from said magnet on said shaft with movement of the diaphram from said neutral position.

3,989,912

LIGHTED PUSHBUTTON ELECTRICAL SWITCH

Richard C. Francke, Streamwood, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Jan. 23, 1975, Ser. No. 543,567
Int. Cl.² H01H *3/12*
U.S. Cl. 200—159 A **10 Claims**



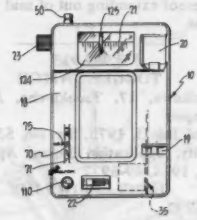
1. An electrical pushbutton switch comprising a housing having a plurality of wall segments and an interior opening formed of said wall segments, at least one pair of stationary contacts each contact of which is secured to one of said wall segments which is substantially parallel another of said wall segments to which the other contact of the pair of stationary contacts is secured, a moving contact member which is received in said interior opening of said housing and which has at least one flat element with a plurality of sides aligned so that the periphery of said flat element conforms to at least a portion of the periphery of said opening and with at least a pair of contact means extending from said flat element, each contact means being located on a portion of said flat element which is parallel and adjacent to one of said stationary contacts, a return bias spring which engages said moving contact member for biasing said moving contact member to an initial state, pushbutton means which also engages said moving contact member so that said moving contact member is positioned intermediate said bias spring and said pushbutton means for exerting force on said moving contact member against the bias return force supplied by said return spring, said pushbutton means comprising a pushbutton cap which has a plurality of extending legs thereon, each of which engage said moving contact member along a contact line which is substantially parallel to one of said flat element sides from which no contact means extend but which is adjacent to a flat element side from which one of said contact means extends.

3,989,913

INTRAVENOUS FEEDING PUMP TIMER

Ingemar H. Lundquist, Oakland, and Leif J. Sundblom, Castro Valley, both of Calif., assignors to Valleylab, Inc., Boulder, Colo.

Filed Oct. 11, 1974, Ser. No. 514,220
Int. Cl.² H01H *43/00*
U.S. Cl. 200—35 R **7 Claims**



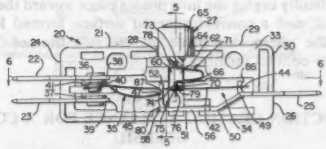
1. In a timing device for an intravenous feeding pump, a two-speed motor having one speed which is a normal speed and another speed which is a speed substantially lower than the normal speed, a main drive shaft driven by said motor, a rotatable and settable dial for indicating the time the device is to be operative, a reducing gear train driven by said main drive shaft and operable to rotate said settable dial in one direction, switch means electrically connected to the motor for controlling the flow of power to said motor and having first and second operative positions and in the first position causing said motor to operate at its normal speed and in the second position causing said motor to operate at the lower speed, a movable member operative upon return of said setting dial to its 0 position to operate said switch means to move the same from the first to the second operative position and a control member movable from a position at which it disables said movable member to a position in which said movable member is operative upon return of said setting dial to its 0 position.

3,989,914

ELECTRICAL SWITCH CONSTRUCTION

John W. Stearley, Grove City, and Roger L. Warner, Union Township, both of Ohio, assignors to Robertshaw Controls Company, Richmond, Va.

Continuation of Ser. No. 298,020, Oct. 16, 1972, abandoned. This application June 9, 1975, Ser. No. 585,247
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² H01H *13/36*
U.S. Cl. 200—67 D **8 Claims**



1. An electrical switch construction comprising a housing means, a movable switch blade means carried by said housing means, and a movable actuator means carried by said housing means for causing movement of said switch blade means between operating positions thereof upon movement of said actuator means between operating positions thereof, said actuator means having spring means for engaging against said blade means and moving said blade means in unison therewith as said actuator means moves in unison therewith in one direction to a predetermined position relative to said housing

means and for thereafter preventing further movement of said blade means in said one direction even though said actuator means is further moved in said one direction beyond said predetermined position, said spring means comprising a reversely bent single leaf spring member having an elbow and opposed ends, said actuator means having a chamber therein that intersects with a side slot thereof and an end slot thereof, said spring member being disposed in said chamber and having said elbow thereof extending out of said side slot and one opposed end thereof extending out of said end slot to engage said blade means.

3,989,915

TOGGLE SWITCH

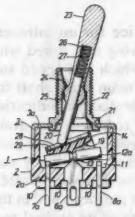
Kikuyoshi Nishikawa, 17, Tsuoka-cho, Asahi, Yokohama, Kanagawa, Japan

Filed Jan. 3, 1975, Ser. No. 538,277

Claims priority, application Japan, Apr. 10, 1974, 49-41522; Jan. 11, 1974, 49-6972

Int. Cl.² H01H *13/18*

U.S. Cl. 200—67 G **7 Claims**



5. A switch comprising a casing having an insulating bottom wall, a common terminal, first and second transfer terminals located on the opposite sides of said common terminal, said terminals extending through and being secured to said insulating bottom wall, the portion of said common terminal within said casing having a pointed tip, an elongated rod-shaped movable contact member having a grooved central region which receives the pointed tip of said common terminal for supporting said movable contact member within the casing on the common terminal, the point of support serving as a fulcrum for a seesaw motion of the movable contact member for switching contact with the first and the second transfer terminals, an interposing piece of an insulating material disposed on the movable contact member, operating means carried by a top plate of the casing, said operating means including pusher means in slidable engagement with and along an elongated region extending lengthwise of said movable contact member on the side of said interposing piece remote from said movable contact member for imparting a seesaw motion to the movable contact member, said operating means also including means for resiliently urging the interposing piece toward the common terminal, and a convexly curved surface formed lengthwise along the interposing piece on the side thereof facing the movable contact member.

3,989,916

INDUCTION HEATING APPLIANCE FOR A COOKING UTENSIL

Keizo Amagami; Hazime Mori; Hideyuki Kominami, and Yukio Hirai, all of Kadoma, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

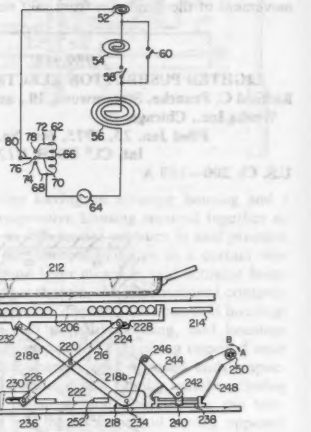
Continuation-in-part of Ser. No. 415,543, Nov. 14, 1973, abandoned. This application Aug. 30, 1974, Ser. No. 502,214

Claims priority, application Japan, Nov. 15, 1972, 47-131890[U], 47-114985[U], 114987[U], 114988[U]; Aug. 9, 1973

Int. Cl.² H05B *5/04*

U.S. Cl. 219—10.49 **10 Claims**

1. An induction heating appliance for inductively heating a cooking utensil comprising, in combination: a cooking plate on which the cooking utensil is to be placed; induction heating means mounted below said cooking plate for generating an alternating magnetic field to heat the cooking utensil; an inverter means connected to said induction heating means to energizing same; a non-magnetic plate; a pantograph type device deposited on said non-magnetic plate; a coil supporting means for substantially horizontally mounting said induction means thereon, said coil supporting means being fixedly secured on said pantograph type device to be vertically moved thereby in parallel relationship relative to said cooking plate; control means for adjusting a vertical position of said coil supporting means, said control means including a flexible line, which is connected to at least one framework of said pantograph type device, said flexible line serving to adjust the vertical position of said coil supporting means in that it may be



pulled to raise said pantograph type device and may be relaxed to lower said pantograph type device due to the weight of said induction heating means; a dummy coil connected in parallel to said induction heating coil, and switching means for normally connecting said induction heating means to said inverter means and for disconnecting the induction heating means from said inverter means and connecting said dummy coil to said inverter means for preventing heating of said cooking utensil when said induction heating means is moved to its lowermost position by said pantograph type device.

7. An induction heating appliance for inductively heating cooking utensils comprising, in combination: a cooking plate on which at least one cooking utensil is to be placed; induction heating means mounted below said cooking plate for generating an alternating magnetic field to heat the cooking utensil; rectifying means to rectify alternating current; an inverter unit having a gate-controlled rectifier and a diode which are connected in parallel to said rectifying means; a gating circuit connected to a gate terminal of said gate-controlled rectifier; a filter inductor interposed between said rectifying means and said inverter unit; a series resonance circuit having a capacitor and an induction element which are connected in parallel to said inverter unit; a filter capacitor connected in series with said induction heating means to form a first combination which is connected in parallel with said series resonance circuit and driven thereby; wherein said induction heating means includes a plurality of spiral coils; wherein said induction cooking appliance includes inductive circuit compensating means connected in series with said induction heating means for compensating variations of inductance thereof; at least first and second switching means, said first switching means being adapted to connect selectively said spiral coils to said

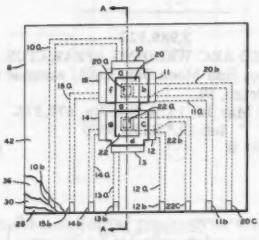
series resonance circuit and said second switching means being interlocked with said first switching means to vary selectively inductance of said inductance compensating means to effect compensation for variations of inductance of said induction heating means; and wherein said plurality of spiral coils are arranged substantially concentrically and vertically, each of the junctions of said plurality of spiral coils are provided with at least two taps which are connected to said first switching means, and said induction cooking appliance further includes at least one on-off switch interlocked with said first switching means and connected through two stationary contacts thereof across said induction heating means and through a movable contact thereof to said second switching means.

3,989,917

THERMAL PRINTING HEAD

Albert Ernst Paschkis, Gwynedd Valley, Pa., assignor to Leeds & Northrup Company, North Wales, Pa.

Filed Oct. 1, 1975, Ser. No. 618,661
Int. Cl.² H05B *1/00*
U.S. Cl. 219—216 3 Claims



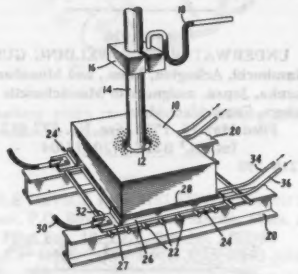
1. A thermal print head comprising
seven separate resistive heating segments, six of said segments being arranged as peripheral segments of a figure "8" with the seventh segment forming the central segment of said figure,
a separate electrical conductive segment defining the outside boundary of each of said peripheral segments,
means providing an electrical connection to each of said separate conductors,
two spaced electrically conductive areas representing the internal areas of the figure "8", each of said areas defining the inside boundaries of associated peripheral segments with both of said areas jointly defining the boundaries of said central segment, and
means providing a single electrical connection only to each of said two spaced conductive areas.

3,989,918

APPARATUS FOR USE IN REPAIR OF INGOT MOLDS

Einar Onarheim, Vagsbygd, Norway, assignor to Elkem-Spigerverket A/S, Oslo, Norway

Filed June 23, 1975, Ser. No. 589,469
Claims priority, application Norway, June 27, 1974, 2348/74
Int. Cl.² H01R *3/06*
U.S. Cl. 219—76 6 Claims



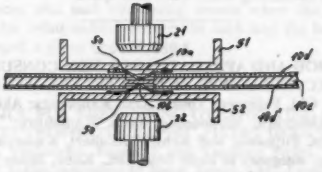
1. In the method of repairing ingot molds by heating the mold with electric current supplied by an electrode, the improvement comprising resting the ingot mold on a bed of finely divided electrically conductive material which is electrically connected to ground.

3,989,919

RESISTANCE WELDING OF SHEET METAL COVERED WITH NON-METALLIC LAYERS

Johann Karl Wefers, Kleinblittersdorf, Germany, and Otto Alfred Becker, 59 Robert Koch Strasse, 66 Saarbrucken 6, Germany, assignors to by said Johann Karl Wefers said Otto Alfred Becker

Division of Ser. No. 105,090, Jan. 8, 1971, Pat. No. 3,800,118, which is a continuation of Ser. No. 668,414, Sept. 18, 1967, abandoned, This application Feb. 12, 1974, Ser. No. 441,909
Claims priority, application Germany, Sept. 21, 1966, 89001; Nov. 11, 1966, 89773; Nov. 15, 1966, 89848; Nov. 22, 1966, 89932; Dec. 10, 1966, 90240; Jan. 7, 1967, 90625; Feb. 6, 1967, 91605; Feb. 11, 1967, 91162; Feb. 27, 1967, 91404; Apr. 24, 1967, 92210; May 26, 1967, 92707; Sept. 2, 1967, 94270; United Kingdom, Sept. 8, 1967, 41049/67
Int. Cl.² B23K *11/10*
U.S. Cl. 219—94 6 Claims



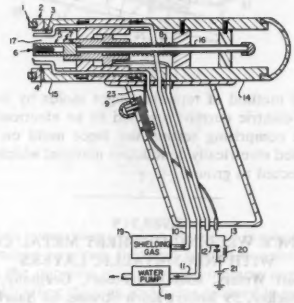
1. A method of welding sheet metal parts to sheet metal parts wherein at least one of said sheet metal parts is coated on the interior side thereof facing the other sheet metal part to be welded, comprising the steps of:
a. removing the coating layer at the welding area by milling out by means of a milling cutter the coating layer thereby producing in the sheet metal part a cavity in the form of a smooth-faced, geometrically defined bare metal welding area with accurately defined boundaries, without affecting parts of the coating adjacent the welding area,

b. inserting an intermediate welding piece between said sheet metal parts in said cavity,
c. establishing electrical contact for welding by superimposing said sheet metal parts so that said parts when under pressure in the welding area are in physical, metal-to-metal contact with said intermediate welding piece, and
d. welding the sheet metal parts by passing a welding current through said sheet metal parts and said intermediate welding piece while the same are in pressure contact in said welding area.

3,989,920
UNDERWATER STUD WELDING GUN

Koichi Masubuchi, Arlington, Mass., and Muneharu Kutsuna, Takarazuka, Japan, assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 15, 1975, Ser. No. 577,582
Int. Cl.² B23K *9/20, 11/04*
U.S. Cl. 219—98 **3 Claims**



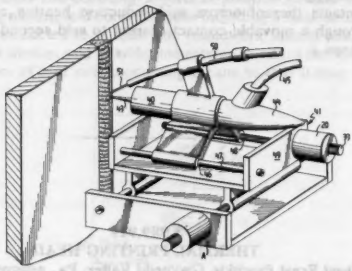
1. An underwater stud-welding gun comprising
a stud-welding gun having a cylindrical end enclosure containing a stud-holding tip,
a resilient sealing member attached to the end of said cylindrical enclosure and extending along the circumference of said cylindrical enclosure,
means for removing water from said cylindrical enclosure when said sealing member is pressed against a welding surface thereby forming a watertight sealed cylindrical enclosure,
means for providing a flow of inert gas in the space between the end of the stud-holding tip and said surface to remove any remaining water from said space.

3,989,921
METHOD AND APPARATUS FOR NON-CONSUMABLE ELECTRODE TYPE AUTOMATIC ARC WELDING

Atsushi Ohi, Fujisawa; Toshio Arai, Kamakura; Akihiko Ihochi, Odawara; Hironosuke Kada, Kamakura; Teruyoshi Sekino, Fujisawa, and Kenichi Akahori, Kamakura, all of Japan, assignors to Kobe Steel Ltd., Kobe, Japan

Filed Mar. 28, 1974, Ser. No. 455,908
Claims priority, application Japan, Mar. 28, 1973, 48-35273
Int. Cl.³ B23K *9/12*
U.S. Cl. 219—131 F **4 Claims**

1. A non-consumable electrode type automatic arc welding apparatus wherein an arc voltage is generated between a non-consumable electrode and a workpiece comprising:
a non-consumable electrode;
a workpiece;
means for moving the electrode toward and away from the workpiece;
a filler wire;
means for feeding the filler wire toward the workpiece and the electrode;
means for detecting the arc voltage comprising an integrating element;
means for generating an arc reference voltage;
means for detecting a difference between the arc reference voltage and the arc voltage to control in accordance therewith the means for moving the electrode toward and

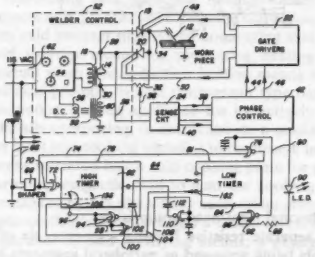


away from the workpiece to control the arc voltage and thereby control the arc length;
means for detecting as the filler wire voltage the voltage between the filler wire and the electrode;
means for generating a filler wire reference voltage;
means for detecting a difference between the filler wire reference voltage and the filler wire voltage to control in accordance therewith the means for feeding the filler wire toward the workpiece and the electrode.

3,989,922
PULSED ARC WELDING APPARATUS

Michael D. Fahey, Half Moon Bay, Calif., assignor to United Air Lines, Chicago, Ill.

Filed May 16, 1974, Ser. No. 470,575
Int. Cl.² B23K *9/00*
U.S. Cl. 219—131 R **15 Claims**



1. Arc welding apparatus for connection to power source means providing a periodic voltage of predetermined magnitude and period, said apparatus being utilized in welding a conductive work piece and comprising
a. welding transformer means having a secondary winding,
b. electrode means electrically coupled to a first point on said secondary winding,
c. conductor means for connection to said work piece and electrically connected to a second point on said secondary winding whereby a weld voltage between said electrode means and said conductor means provides welding heat at said work piece,

d. gate means in circuit with said secondary winding, said conductor means and said electrode means to periodically switch between an effective conductive condition and an effective non-conducting condition at least once during each period of said power source means, said secondary winding, said electrode means, said conductor means and said gate means being in series to form a weld current circuit, said gate means comprising two controlled rectifiers connected in parallel with opposite polarity, and

e. means directly electrically connected to said weld current circuit including first means for generating a voltage dependent upon current, other than said weld current, conducted through said gate means and second means for sensing the magnitude and phase of a summation of the voltage across said secondary winding and said voltage generated by said first means, said second means providing an output signal to control said rectifiers whereby said rectifiers become conductive at predetermined times in accordance with the sensed magnitude and phase.

3,989,923
WIRE HEAT TREATING APPARATUS

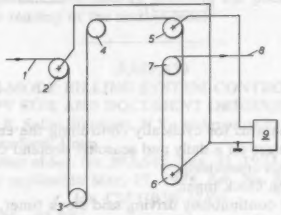
John Lees, and Kenneth Taylor, both of Great Dunmow, England, assignors to International Standard Electric Corporation, New York, N.Y.

Continuation of Ser. No. 397,033, Sept. 13, 1973, abandoned. This application Nov. 15, 1974, Ser. No. 524,120

Claims priority, application United Kingdom, Nov. 11, 1972, 46781/72; Feb. 13, 1973, 6943/73

Int. Cl.² H05B *3/00*

U.S. Cl. 219—155 **15 Claims**



1. Electrical heat treating apparatus for solid wire electrical conductors comprising a plurality of electrical contact pulleys and insulated guide pulleys feeding a wire conductor along a predetermined path, and means applying electrical current to said contact pulleys and wire for heating said wire, said contact pulleys having wire contacting faces of a metallic material having a melting point of at least 1200° C and a relatively high resistance to wear.

3,989,924
PORTABLE ELECTRICALLY HEATED GARMENT

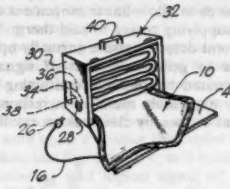
Enid Baum Kurtzer, Willowdale, Canada, assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Oct. 15, 1975, Ser. No. 622,424

Int. Cl.² H05B *1/00*

U.S. Cl. 219—211 **1 Claim**

1. Body warming apparatus comprising: an electrically heated cape garment having a main electrically heated portion for engagement around the body of a user; an electrically heated hood portion interconnected electrically with said main portion for engagement about the head of the user; a pair of slits in said main portion for receiving the arms of the user therethrough; said main portion having an electrical input cable terminated with a first electrical connector means; a carrying case for said garment; a battery within said carrying case; a second electrical connector means mounted through a wall of said carrying case; said first and second electrical connector means being configured for mating engagement;



and said battery being connected for feeding said second electrical connector means.

3,989,925
PORTABLE DEVICE FOR MELTING ICE AND SNOW

Leroy Garner, P.O. Box 652, Grand Marais, Minn. 55604

Filed Feb. 19, 1975, Ser. No. 550,980

Int. Cl.² H05B *11/00*; E01H *5/10*; F24J *3/00*

U.S. Cl. 219—227 **3 Claims**

1. A device for melting snow and ice comprising:

a. a support including a tank;

b. heating means carried by said tank including a series of spaced heating tubes mounted on the tank externally thereof and communicating with the interior of the tank,

c. a heating element mounted in said tank,

d. a support handle,

e. said support handle pivotally connected at one end to said tank to allow a change of angular relationship between the tank with the tubes thereon and the handle,

f. means for circulating a liquid heated by said heating element through said tank and said heating tubes,

g. a switch carried by said tank for deactivating said heating element and said circulating means when the pivotal angular relationship between the tank and the handle is changed a given degree.

3,989,926
DEVICE FOR PREVENTING OVERHEATING OF ELECTROPHOTOGRAPHIC FIXING DEVICE

Masataka Yoshizawa, Iwatsuki, and Yasuhiro Fujita, Omiya, both of Japan, assignors to Rank Xerox, Ltd., London, England

Continuation of Ser. No. 354,059, April 4, 1973, abandoned. This application Jan. 22, 1975, Ser. No. 543,110

Claims priority, application Japan, June 19, 1972, 47-60452

Int. Cl.² H05B *1/02*; H01H *61/04*, *37/46*

U.S. Cl. 219—358 **3 Claims**

1. In a xerographic reproducing apparatus, the improvement comprising:

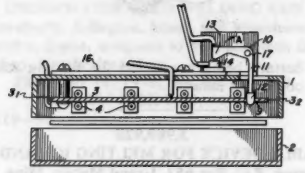
a thermal fixing device including a thermally expansible member supported thereby, said thermally expansible member having a high coefficient of thermal expansion, said thermally expansible member being relatively thin

whereby it comprises a low thermal mass, the thermal expansion of which is quite rapid;

means supporting one end of said thermally expansible member in a fixed position while supporting the other end thereof so as to allow linear movement thereof;

means for supplying power to said thermal fixing device;

a displacement detector and a normally open switch which cooperate to generate a shut-off signal, said detector being actuated by physical contacting thereof by said thermally expansible member in response to said linear movement to thereby close said normally open switch;



means responsive to said shut-off signal to interrupt the power supply to said thermal fixing device;

said displacement detector comprising a pivotably mounted lever arm and said thermal fixing device comprising a resistance heating element having an opening receiving said lever arm, said lever arm having a generally right angle configuration and being supported for pivotable movement intermediate the extremities thereof, one of said extremities being received in said opening in said resistance heating element and the other of said extremities forming one part of said normally open switch which is adapted to be closed through pivoting of said lever arm.

3,989,927

ELECTRIC HEATER UTILIZING A POURABLE HEAT STORAGE BULK

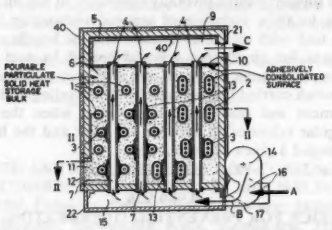
Georg Otto Erb, D-5241 Bindweide, Westerwald, Germany

Filed Aug. 6, 1973, Ser. No. 385,691

Claims priority, application Germany, Aug. 5, 1972, 2238612; Aug. 5, 1972, 2238611

Int. Cl.² H05B 1/00; F24H 7/02

U.S. Cl. 219—378 **27 Claims**



1. A storage heater for heating a gaseous heat extraction medium, the heater comprising: a container having walls formed of a heat resistant material; at least one guide duct, in the form of a tube extending through the container, for carrying gaseous heat extraction medium; a thermal storage medium within the container, means associated with the container for supplying heat to the storage medium, the medium comprising heavy metal-bearing minerals and being in the form of a pourable heavy metal-bearing minerals and being in the form of a pourable bulk of particulate solids and being suitable for directly contacting air to be heated for places of human habitation; the product of the specific heat of the solid and the bulk density of the pourable bulk being at least 0.7 kcal/° C dm³, the specific heat of the solid being at least 0.12 kcal/° C kgf and the bulk density of the pourable bulk being at least 2.5 kgf/dm³.

3,989,928

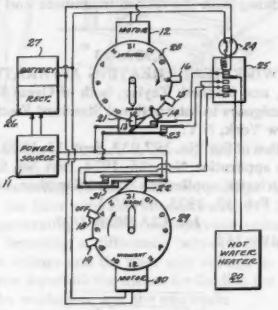
METHOD AND APPARATUS FOR CYCLICALLY CONTROLLING THE ENERGIZATION OF HOME WATER HEATERS

Robert L. Scragg, and Alfred B. Parker, both of 2937 SW. 27th Ave., Miami, Fla. 33133

Filed Apr. 1, 1975, Ser. No. 564,089

Int. Cl.² F24H 1/00

U.S. Cl. 219—334 **6 Claims**



1. An apparatus for cyclically controlling the energization of water heaters on a daily and seasonal demand cycle basis, said apparatus comprising:

at least one clock timer,

means for continuously driving said clock timer,

a first relay for controlling the energization of said water heater,

a first plurality of actuator means for energizing said relay, alternate ones of said actuators opening said relay to inhibit energization of said water heater,

means responsive to said clock timer for continuously and cyclically moving said actuator means into engagement with said relay, said actuators being spaced with respect to one another to prevent energization of said water heater during a substantial portion of the peak power demand interval during a summmer load demand cycle,

a second relay for controlling the energization of said water heater,

a second plurality of actuator means for energizing said second relay, alternate ones of said actuators opening said second relay to inhibit energization of said water heater,

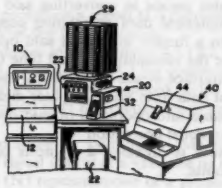
means responsive to said clock timer for continuously and cyclically moving said second plurality of actuator means into engagement with said second relay, said second actuator means being spaced with respect to one another to prevent energization of said water heater during a substantial portion of the peak demand interval during a winter load demand cycle, and

means for selectively coupling at least one of said first and second relays to said water heater, depending on whether a summer or winter load demand cycle, respectively, exists.

3,989,929
APPLICATION OF HUMAN READABLE AND MACHINE READABLE LABELS

Fritz F. Treiber, Dayton, Ohio, assignor to Hobart Corporation, Troy, Ohio

Filed Apr. 30, 1975, Ser. No. 573,595
Int. Cl.² G06K *3/00*
U.S. Cl. 235—61.9 R **6 Claims**



1. A label applicator for applying two labels bearing related information to opposite sides of random weight packages of a commodity, one of said labels having machine readable information thereon, comprising:

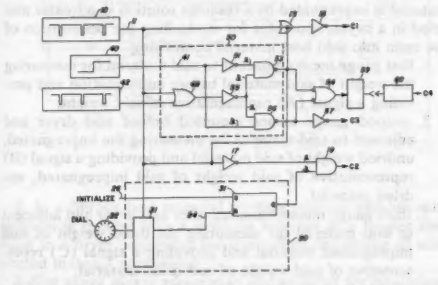
means for presenting a human readable first label for application to a predetermined region on a first side of the package, and

means for separately presenting a machine readable second label for application to a second side of said package at a point which has a predetermined positional relation to said first label whereby the first label can be utilized as a guide to locate the position of the second label as the package is manipulated with the second side away from the person subsequently handling the package for machine reading of the second label.

3,989,930
MULTI-MODE BILLING SYSTEM CONTROLLED BY COPY SIZE AND DOCUMENT ORIGINAL SIZE

Lawrence R. Sohm, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 393,545, Aug. 31, 1973, abandoned.
This application Mar. 27, 1975, Ser. No. 562,536
Int. Cl.² G03B *27/06*
U.S. Cl. 235—92 SB **9 Claims**



1. Counting apparatus for automatic reproducing equipment operable in a first mode for making copies up to a first size, and in a second mode for making copies up to a second size, said second size being larger than said first size, said apparatus comprising:

first pulse means for generating count pulses representing copies made in said first mode;

first counting means;

first enabling means for enabling said first counting means to record cummulatively the total copy count pulses from said first pulse means;

second pulse means for generating second copy count pulses representing copies made in said second mode;

second counting means;

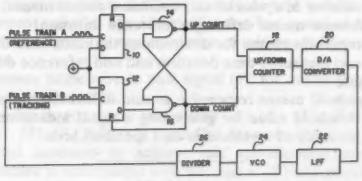
logical signal generating means responsive to equipment operation in said second mode for sensing the size of copies made, said logical signal generating means generating a logical signal of one state upon a sensing the copies made are up to said first size, and a logical signal of another state upon a sensing the copies made are of a size larger than said first size up to said second size; and

means responsive to said logical signal of one state for enabling said first counting means for recording cummulatively the copy count pulses from said second pulse means or responsive to said logical signal of another state for enabling said second counting means for recording cummulatively the copy count pulses from said second pulse means.

3,989,931
PULSE COUNT GENERATOR FOR WIDE RANGE DIGITAL PHASE DETECTOR

Donald E. Phillips, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 19, 1975, Ser. No. 578,773
Int. Cl.² G06M *3/12, 3/14*; H03K *9/00*
U.S. Cl. 235—92 FQ **14 Claims**



1. A pulse count generator for providing mutually exclusive counting pulses corresponding to the pulses contained in two pulse trains, comprising:

pulse generator means having two inputs and two outputs, each output being associated with a different one of said inputs for providing a bilevel signal, the first level occurring in the absence of an actuating signal at its associated input and the second level occurring in the presence of an actuating signal, arranged so that an output signal is enabled to change to a second level only in the presence of a first level signal at the other output;

first storage means for receiving one of the pulse trains connected to one of said inputs for generating and applying thereto an actuating signal for each pulse contained in that pulse train and also connected to the pulse generator means output associated with said connected input for terminating each actuating signal in response to the second level signal generated therefrom; and

second storage means for receiving the other pulse train connected to the other one of said inputs for generating and applying thereto an actuating signal for each pulse contained in that pulse train and also connected to the pulse generator means output associated with said connected other input for terminating each actuating signal in response to the second level signal generated therefrom.

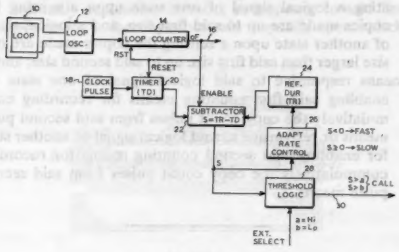
3,989,932
INDUCTIVE LOOP VEHICLE DETECTOR

Ralph J. Koerner, Canoga Park, Calif., assignor to Canoga Controls Corporation, Canoga Park, Calif.

Continuation of Ser. No. 444,519, Feb. 21, 1974, abandoned. This application Jan. 23, 1975, Ser. No. 543,309

Int. Cl.² G01R *23/06;* **G08G** *1/01*

U.S. Cl. 235—92 FQ **20 Claims**



1. Apparatus useful in conjunction with a roadway for detecting the presence of a vehicle on a specified area of the roadway, said apparatus comprising:

a loop of wire supported adjacent the surface of said roadway within said specified area;

oscillator circuit means connected to said loop of wire for oscillating at a frequency dependent on the inductance of said loop;

timing means for measuring the time duration of a fixed number of cycles of said oscillator circuit means;

reference means defining a reference duration;

comparison means for determining the difference between said measured time duration and said reference duration; and

threshold means responsive to said difference exceeding a threshold value for generating a signal indicative of the presence of a vehicle in said specified area.

3,989,933
CONNECTION DEVICE FOR CONNECTING A STEREOCOMPARATOR TO AN ELECTRONIC COMPUTER DESIGNED TO SET UP AN ANALYTIC PHOTOGRAMMETRIC PLOTTING UNIT

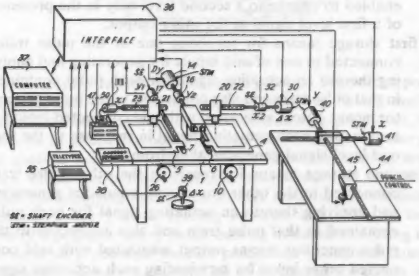
Giuseppe Inghilleri, Turin, Italy, assignor to Officine Galileo S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 378,330, July 11, 1973, abandoned. This application Mar. 18, 1975, Ser. No. 559,654

Claims priority, application Italy, July 12, 1972, 9580/72

Int. Cl.² G06F *3/14;* **B43L** *13/18*

U.S. Cl. 235—151 **14 Claims**



1. Apparatus comprising:

a. computer means to supply numerical data;

b. operator controlled means for effecting stereoscopic photogram exploring motions relative to two stereoscopically related photograms;

c. first interface means for transducing said motions into signals which are fed into said computer means; said computer means converting said signals into numerical data and correcting said numerical data for parallax in real time;

said computer means in converting said signals into corrected numerical data calculating supplemental values relating to a further motion in said operator controlled means for the elimination in real time of parallex; and

d. second interface means for receiving the thusly corrected numerical data from said computer means and transducing the same into operation of said operator controlled means for visual correction

whereby there is obtained a rigorous orientation of observed points.

3,989,934
WEB PENETRATION CONTROL

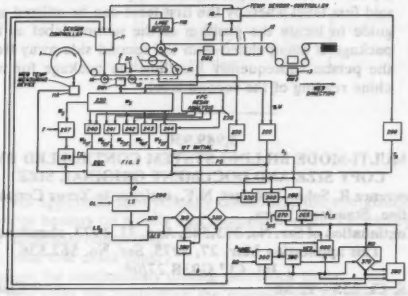
Charles Robert Fay, Cincinnati, Ohio, assignor to Formica Corporation, Cincinnati, Ohio

Filed Nov. 1, 1974, Ser. No. 520,063

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² G06G *7/58*

U.S. Cl. 235—151.1 **19 Claims**



11. In a fibrous host material treating process wherein said material is impregnated by a resinous solution in a treater and dried in a dryer, apparatus for controlling the penetration of the resin into said host material comprising

1. first gauge means adjacent to said material for measuring the weight of said material before impregnation and providing a signal (A) representative of said weight,

2. second gauge means mounted before said dryer and adjacent to said material for measuring the impregnated, undried weight of said material and providing a signal (B) representative of said weight of said impregnated, undried material,

3. third gauge means mounted after said dryer and adjacent to said material for measuring the dried weight of said impregnated material and providing a signal (C) representative of said weight of said dried material,

4. means for providing a signal (D) representative of the initial temperature of said host material,

5. means for providing a signal (E) representative of the resin solids fraction of said resinous solution,

6. means responsive to said signals (A), (B), (C) and (E) for calculating the actual percent volatiles of said impregnated, dried material and providing a signal (F) representative of said actual percent volatiles,

7. means for providing a signal (G) representative of the solvent component percentages and a signal (H) repre-

sentative of the latent heat of vaporization of each solvent component of said resinous solution,

8. means for measuring the line speed of said material and providing a signal (I) representative of said line speed,
9. means for providing a signal (J) representative of the dryer length,
10. means for measuring the temperature of said dryer and providing a signal (K) representative of said dryer temperature,
11. means for providing a signal (L) representative of the heat capacity of the host material,
12. means responsive to said signals (A), (B), (D), (E), (F), (G), (H), (I), (J), (K) and (L) for computing the actual film coefficient of the impregnated, dried material and providing a signal (M) representative of said actual film coefficient,
13. means responsive to said signal (M) for computing whether said signal (M) is at a variance or in compliance with a signal (N) representative of a predetermined film coefficient and providing a signal (O) representative of the conformity or non-conformity of said signal (M) and said signal (N),
14. means responsive to said signal (O) for computing the penetration change required to substantially equalize said signal (M) and said signal (N) and providing a signal (Q) representative of said required penetration change and
15. means responsive to said signal (Q) for controlling the penetration of said resin into said host material.

3,989,935

METHOD AND APPARATUS FOR CONTROLLING A MATERIAL TREATER

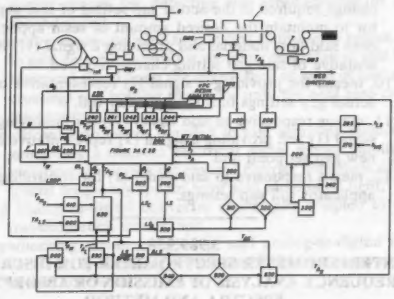
Charles Robert Fay, Cincinnati, Ohio, assignor to Formica Corporation, Cincinnati, Ohio

Filed Nov. 1, 1974, Ser. No. 520,075

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² G06G 7/58

U.S. Cl. 235—151.1 **12 Claims**



8. In a fibrous host material treating process wherein said material is treated with a resinous solution in a treater and dried in a dryer, apparatus for controlling the drying of said treated material comprising

1. first gauge means adjacent to said material for measuring the weight of said material before treating and providing a signal (A) representative of said weight before treating,
2. second gauge means mounted before said dryer and adjacent to said material for measuring the treated, undried weight of said material and providing a signal (B) representative of said treated, undried weight,
3. third gauge means mounted after said dryer and adjacent to said material for measuring the dried weight of said material and providing a signal (C) representative of said dried weight,
4. means for providing a signal (D) representative of the resin solids fraction of said resinous solution,
5. means responsive to said signals (A), (B), (C) and (D) for computing the actual percent volatiles of the dried, treated material and providing a signal (E) representative of said percent volatiles,
6. means for providing a signal (F) representative of the specification percent volatiles of said dried, treated material,
7. means for providing a signal (G) representative of the solvent component percentages and a signal (H) representative of heat of vaporization of each solvent component of said resinous solution,
8. means for measuring the line speed of said material and providing a signal (I) representative of said line speed,
9. means for providing a signal (J) representative of the dryer length,
10. means for measuring the temperature of said dryer and providing a signal (K) representative of said temperature,
11. means for providing a signal (L) representative of the heat capacity of the host material,
12. means for measuring the temperature of said host material before treating and providing a signal (M) representative of said temperature before treating,
13. means responsive to said signals (A), (B), (C), (D), (E), (G), (H), (I), (J), (K), (L) and (M) for computing the actual film coefficient of the material undergoing drying and providing a signal (N) representative of the actual film coefficient,
14. means for providing a signal (O) representative of the specification line speed of said host material,
15. means responsive to said signals (A), (B), (D), (F), (G), (H), (J), (L), (M), (N) and (O) for computing the temperature needed in the dryer to achieve said specification percent volatiles at said specification line speed and providing a signal (P) representative of said needed temperature,
16. means responsive to said signal (P) for controlling the dryer temperature,
17. means responsive to said signals (A), (B), (D), (F), (G), (H), (J), (K), (L), (M) and (N) for computing the line speed necessary to achieve said specification percent volatiles in accordance with said signal (K) and providing a signal (Q) representative of said necessary line speed and
18. means responsive to said signal (Q) for controlling said line speed.

3,989,936

METHOD AND APPARATUS FOR THE FEED FORWARD CONTROL OF A MATERIAL TREATER

Charles Robert Fay, Cincinnati, Ohio; Alfred Thomas Guertin, Somerville, and John William Stinson, Wayne, both of N.J., assignors to Formica Corporation, Cincinnati, Ohio

Filed Nov. 1, 1974, Ser. No. 520,076

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² G06G 7/58

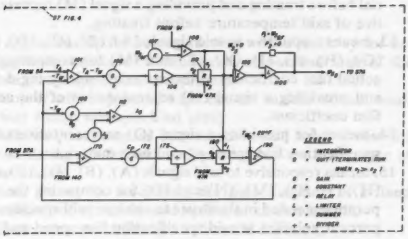
U.S. Cl. 235—151.1 **10 Claims**

6. In a fibrous host material treating process wherein said material is treated with a resinous solution in an applicator and dried in a dryer, apparatus for controlling the resin application to said material and the drying of the treated material comprising

1. gauge means adjacent to said material and before said applicator so as to measure a series of left side portion and right side portion weights of said host material before treatment and provide a signal (A) representative of said left side weights and a signal (B) representative of said right side weights,
2. means responsive to said signals (A) and (B) for calculating the average weight of said host material before treat-

ment and providing a signal (C) representative of said average weight,

3. means responsive to said signal (C) for calculating the desired weight of said host material after treatment and before drying and providing a signal (D) representative of said desired weight,
4. means for measuring the line speed of said host material and providing a signal (E) representative of said line speed,
5. means responsive to said signal (D) and said signal (E) for calculating the required roll speed of said applicator treating said host material and providing a signal (F) representative of said required roll speed,
6. means responsive to said signal (F) for controlling the roll speed of the applicator treating said host material,
7. means for measuring the average temperature of the dryer and providing a signal (G) representative of said average dryer temperature,
8. means responsive to said signal (C) and said signal (G) for calculating the line speed set point and providing a signal (H) representative of said line speed set point,



9. means responsive to said signal (H) for controlling the line speed of said host material,
10. second means responsive to said signal (A) and said signal (B) for calculating the difference between said left side and said right side weights and providing a signal (I) representative of said difference,
11. means responsive to said signal (I) for calculating the roll gap change of said applicator required to enable uniform application of resinous solution and providing a signal (J) representative of said roll gap change,
12. means responsive to said signal (J) for determining the left roll gap set point of said applicator and providing a signal (K) representative of said left roll gap set point,
13. means responsive to said signal (K) for controlling the left gap of said applicator,
14. second means responsive to said signal (J) for determining the right roll gap set point of said applicator and providing a signal (L) representative of said right roll gap set point, and
15. means responsive to said signal (L) for controlling the right roll gap of said applicator.

3,989,937

INTERACTIVE ROLL GAP-REVERSE ROLL SPEED CONTROL OF THE APPLICATOR OF A MATERIAL TREATER

Charles Robert Fay, and James Douglas Richter, both of Cincinnati, Ohio, assignors to Formica Corporation, Cincinnati, Ohio

Filed Nov. 1, 1974, Ser. No. 520,082

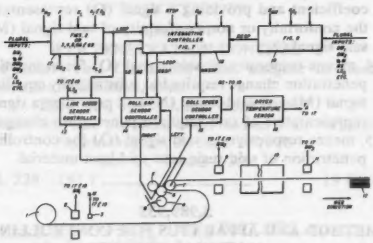
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.[2] G06G 7/58

U.S. Cl. 235—151.1 **10 Claims**

6. In a fibrous host material treating process wherein said material is treated with a resinous solution in a reverse roll applicator and dried in a dryer, apparatus for controlling the application of said solution comprising

1. means for providing a signal (A) representative of the required line speed set point of said applicator,
2. means for providing a signal (B) representative of the desired roll speed set point of said applicator,
3. means responsive to said signal (A) and signal (B) for calculating the ratio of said desired roll speed set point to said required line speed set point and providing a signal (C) representative of said ratio,
4. means for providing a signal (D) representative of the desired set point of said ratio,
5. means responsive to said signal (C) and signal (D) for calculating the deviation of said signal (C) from said signal (D) and providing a signal (E) representative of said deviation,
6. means responsive to said signals (A), (B) and (E) for calculating the required change in the desired roll speed



set point of said applicator and providing a signal (F) representative of said required change,

7. means responsive to said signal (F) for modifying said signal (B) and providing a signal (G) representative of the actual roll speed set point,
8. means responsive to said signal (G) for controlling the actual roll speed,
9. means responsive to said signal (F) for calculating the change required in the actual gap setting of said applicator to maintain the desired amount of resin application onto said host material and providing a signal (H) representative of said gap setting change required.
10. means for providing a signal (I) representative of the actual gap settings of said applicator roll,
11. means responsive to said signal (H) for modifying said signal (I) and providing a signal (J) representative of the new gap set point and
12. means responsive to said signal (J) for controlling said applicator roll gap settings.

3,989,938

INTERFEROMETER SPECTROMETER FOR DISCRETE FREQUENCY ANALYSIS OF EMISSION OR ABSORPTION SPECTRA AND METHOD

Gerald L. Auth, Laguna Beach, Calif., assignor to Eocom Corporation, Irvine, Calif.

Division of Ser. No. 265,742, June 23, 1972, abandoned. This application Nov. 7, 1974, Ser. No. 521,796

Int. Cl.[2] G06F 15/34

U.S. Cl. 235—151.35 **12 Claims**

1. A gas analyzer for determining the presence and amount of certain components of a gaseous sample comprising:

a container having gas entrance and exit ports;

incoherent light furnishing means coupled to said container for introducing incoherent light through said sample to emerge as an output therefrom;

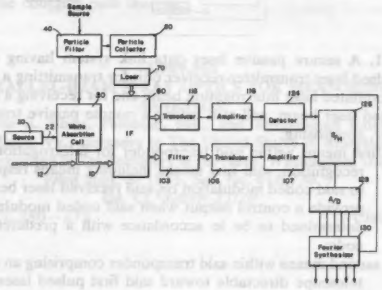
interferometric means optically coupled to said container for optically processing the output light emerging from said sample, said interferometric means being a moving mirror Michelson interferometer;

a coherent light source optically coupled to said interferometric means, the coherent light emanating therefrom being optically processed thereby;

optical filter means coupled to said interferometric means for optically eliminating from said optically processed light all light whose frequency is at least equal to the frequency of said coherent light;

first transducive means electro-optically coupled to said interferometric means for converting said optically processed light emerging from said sample into a first analogue electric signal whose amplitude varies with the position of said moving mirror and which contains spatial frequency information concerning said light emerging from said sample in essentially the inverse Fourier transform of the spatial frequency spectrum of said light;

second transducive means electro-optically coupled to said interferometric means for converting said optically processed coherent light into a second electrical signal which periodically crosses zero as said mirror moves through an



increment of length $\Delta\delta$, δ being the distance said mirror has moved from its initial position;

zero-crossing detector means coupled to said second transducive means for detecting the zero-crossings of said second signal;

sampling means coupled to said first transducive means and to said detector means for sampling the value of said first electrical signal upon the occurrance of each of said zero crossings and holding that value until the next zero crossing occurs;

transformation means coupled to said sampling means for generating a discrete electrical signal whose amplitude variation represents the inverse Fourier transform of the spatial frequency spectrum of said attenuated light;

an analog-to-digital converter electrically coupled to said transformation means; and

synthesizing means coupled to said analog-to-digital converter for synthesizing preselected frequency components of said spectrum.

3,989,939

ELECTRONIC CALCULATOR OR DIGITAL PROCESSOR CHIP WITH COMBINED FUNCTIONS FOR CONSTANT, KEYBOARD AND CONTROL BIT

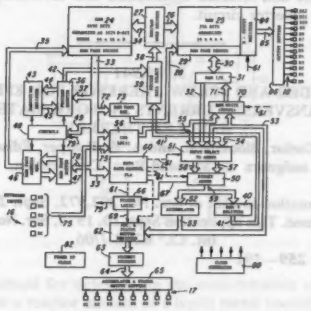
Joseph H. Raymond, Jr., 7618 Eichler, Houston, Harris County, Tex. 77401

Filed Nov. 19, 1974, Ser. No. 525,237

Int. Cl.² G06F *15/02*

U.S. Cl. 235—156 **12 Claims**

1. An electronic digital system comprising: data storage means including a random access memory; addressing means for addressing the random access memory and accessing therein digits containing a plurality of bits in parallel; program storage means including a read-only-memory containing a large number of multi-bit instruction words for defining the operation of the system; arithmetic means for performing arithmetic and logic operations on digits in bit parallel format; control means receiving the instruction words from the read-only-memory in bit parallel, one word at a time, the control means generating commands for defining the operation of the system in response to the instruction words; input means including a plurality of parallel terminals for data input to the



system; multiple function circuity included in the system, the multiple function circuitry having inputs for receiving parts of instruction words and data input from said parallel terminals and having parallel outputs coupled to the data storage means and to the arithmetic means for selectively, in response to said commands, transferring in bit parallel format said parts of instruction words and data input in the alternative to the data storage means or to the arithmetic means.

3,989,940

BINARY INCREMENTER CIRCUIT

Toshimasa Kihara, Kunitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

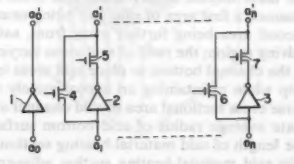
Filed Mar. 20, 1975, Ser. No. 560,488

Claims priority, application Japan, Mar. 27, 1974, 49-33566

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² G06F *7/50*

U.S. Cl. 235—175 **11 Claims**



1. An incrementer circuit comprising:

a plurality of *n*-input terminals for receiving signals representative of *n* binary digits;

a plurality of *n*-output terminals for supplying signals representative of the addition of a "1" to said *n* binary digits; and

a plurality of coupling circuits, connected between said input terminals and said output terminals, for effecting the addition of a "1" to said *n* binary digits and coupling signals representative of the incremented number to said plurality of output terminals, wherein

the coupling circuit for the lowest digit comprises an inverter circuit connected between the input and output terminals for said lowest digit, and

the coupling circuit for each of the second-lowest to *n*th digit comprises

an inverter circuit coupled between the input and output terminals for that particular digit, and

a transfer gate circuit, responsive to the signals representative of the digits lower than that particular digit, for connecting the input terminal for that particular digit to the output terminal for that particular digit through one of a direct non-inverted connection and invertedly through said inverter circuit.

3,989,941

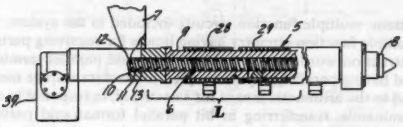
EXTRUDER AND SCREW THEREFOR FOR EFFECTING TRANSVERSE CURRENTS IN WORK MATERIAL HANDLED THEREBY

Joseph Gasior, Bloomfield, and A. W. Pomper, Edison, both of N.J., assignors to Midland-Ross Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 292,972, Sept. 28, 1972, abandoned. This application Sept. 10, 1974, Ser. No. 504,817

Int. Cl.² B29B *1/06*

U.S. Cl. 259—191 **8 Claims**



1. Auger type apparatus useful for heating a potentially thermoplastic particulate or granular material to a temperature approaching its fusion temperature, said apparatus comprising:

a material-heating section having a screw, a barrel coaxially encompassing the screw, and means for heating the barrel; said screw having a core of substantially uniform average diameter and a main thread thereon arranged along the longitudinal axis of the screw to define a spiral main channel extending from an upstream material receiving region toward a material-discharging region;

said core within said section defining a bottom or root surface for said main channel comprising at least one pair of side-by-side parallel areas corresponding in helicity to the main thread; in any transverse cross section of the channel, a first area of said pair being nearer to, and the second area being further away from, said material receiving region; the radii of said areas varying transversely at the channel bottom to place said areas in step relationship while maintaining an approximately uniform transverse cross sectional area of said channel and an approximate average radius of said bottom surface throughout the length of said material-heating section;

within said material-heating section adjacent the material receiving region, the radius of said first area being substantially greater than, and the radius of the second area being substantially less than, said average radius;

the radius of the first area gradually decreasing with concurrent increasing in the radius of the second area in the downstream direction of the screw until said radius of the first area becomes substantially greater and the radius of the second area becomes substantially less, than said average radius;

said barrel acting, during operation, to continually frictionally transfer material at the interface of a second channel portion radially overlying said second area to the interface of a first channel portion overlying said first area to cause displacement of material radially outwardly within said second portion and radially inwardly within said first portion.

3,989,942

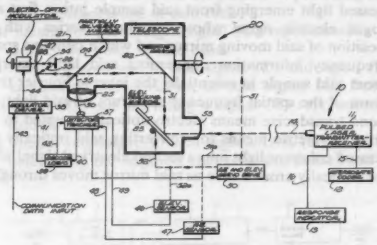
RETRO-REFLECTING LASER RESPONSER AND DATA MODULATOR

Ray O. Waddoups, Valencia, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Dec. 13, 1974, Ser. No. 532,516

Int. Cl.² H04B *9/00*

U.S. Cl. 250—199 **5 Claims**



1. A secure passive laser data link system having a first pulsed laser transmitter-receiver unit for transmitting a coded modulated laser interrogation beam and for receiving a modulated laser beam, and also having a remote passive transponder, comprising:

first means within said transponder for interrogation code recognition, said first means including means responsive to said coded modulation on said received laser beams to provide a control output when said coded modulation is determined to be in accordance with a predetermined code;

second means within said transponder comprising an optical telescope directable toward said first pulsed laser transmitter-receiver unit, said telescope including reflective means within its light path for retro-reflecting said interrogation beam;

and third means responsive to said first means and inserted in said telescope light path for substantially altering the light transmissability, thereby to substantially reduce said retro-reflection of said interrogation beams in the absence of said first means control output and to permit said retro-reflection when said control output is extant.

3,989,943

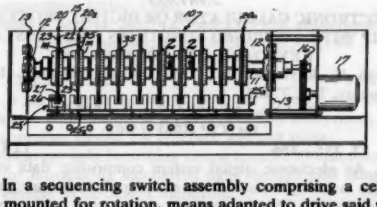
ANGULARLY ADJUSTABLE OPTICAL SWITCH ASSEMBLY

John E. Campbell, 1320 W. Esther St., Long Beach, Calif. 90813; Douglas A. Harley, 6171 Sydney Drive, Huntington Beach, Calif. 92647; Herbert S. Lee, 3262 Tucker Lane, Los Alamitos, Calif. 90720, and John E. Juhasz, 1320 W. Esther St., Long Beach, Calif. 90813

Filed July 3, 1975, Ser. No. 592,982

Int. Cl.² G01D *5/34*

U.S. Cl. 250—233 **7 Claims**



1. In a sequencing switch assembly comprising a central shaft mounted for rotation, means adapted to drive said shaft in rotation, a plurality of switch assemblies mounted on said shaft at selected angular alignment therewith and switching means disposed for cooperation with said switch assemblies

for producing electrical signals indicative of the angular position of said shaft, the improvement comprising:

said switch assemblies each including a timing hub comprising a first sleeve conformed to receive said shaft, a peripheral flange formed on one end of said hub, securing means formed on said first sleeve for securing said hub to said shaft, a first translucent shutter disc including a second sleeve extending from the central opening thereof, said second sleeve being conformed for telescopic receipt of said first sleeve, first clamping means threadably engaging said first sleeve for compressing said second sleeve and said first disc against said peripheral flange, a second translucent shutter disc including a central opening conformed to receive said second sleeve, second clamping means threadably engaging said second sleeve for compressing said second disc against said first disc and opaque mask segments formed on the surfaces of said first and second disc; and

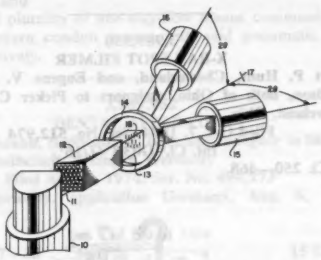
said switching means including a photoelectric coupling circuit having disposed in the coupling path thereof said first and second shutter disc for selective interruption of the coupling path therein.

3,989,944

PARALLEL-BEAM X-RAY OPTICS FOR MEASURING ASBESTOS

Laverne S. Birks, Potomac, Md., and Mohammad Fatemi, McLean, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 5, 1975, Ser. No. 610,730
Int. Cl.² G01N *23/20*
U.S. Cl. 250—272 **7 Claims**



1. A system for identifying and determining the amount of asbestos fibers in a prepared sample which comprises:

an x-ray tube for generating a desired beam of x-rays;

a collimator for collimating said x-rays into a broad beam;

a sample holder for holding said prepared sample of asbestos fibers in the path of said broad beam of x-rays with said asbestos fibers aligned perpendicular to the axis of said collimated x-ray beam;

an x-ray diffraction detector positioned off the axis of said collimated x-ray beam at the diffraction line position for the (002) plane to measure the diffraction signal plus background signal; and

means for rotating said detector 90° on an arc in a plane perpendicular to the axis of said collimated x-ray beam to measure the background signal,

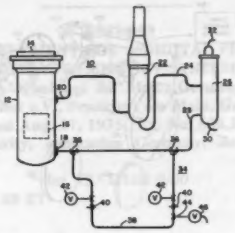
whereby the difference between said detected diffraction signal plus background signal and said background signal is a measure of asbestos fibers in said sample.

3,989,945

METHOD FOR DETERMINING THE CONCENTRATION OF FISSION PRODUCTS IN A REACTOR COOLANT

Martin H. Cooper, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 14, 1974, Ser. No. 479,387
Int. Cl.² G01N *31/06*
U.S. Cl. 250—304 **3 Claims**



1. A method for determining the concentration of fission products in a reactor coolant of a liquid metal cooled nuclear reactor, comprising the steps of:

ducting reactor coolant through a sampling tube for a predetermined period of time at a predetermined rate of flow;

removing the sampling tube;

removing fission products which are adsorbed on the wall of said sample tube by acid leaching; and then,

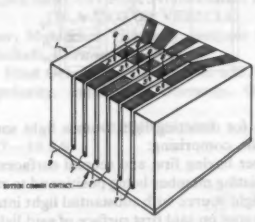
gamma scanning the removed fission products by gamma spectroscopic apparatus.

3,989,946

ARRAYS FOR INFRARED IMAGE DETECTION

Richard A. Chapman, Dallas, and Kenneth E. Bean, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 31, 1975, Ser. No. 563,541
Int. Cl.² H01J *31/49*
U.S. Cl. 250—332 **17 Claims**



1. An array of detectors formed in a single semiconductor wafer, each detector separated from the other on at least two sides by slots extending into the semiconductor wafer, and the detectors varying in width from the end of the array towards the center of the array.

3,989,947

TELESCOPE CLUSTER

Arthur S. Chapman, Rolling Hills, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

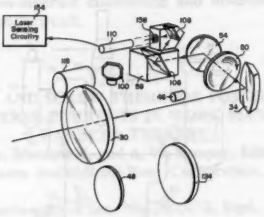
Filed Mar. 1, 1971, Ser. No. 120,019
Int. Cl.² G01J *1/00*
U.S. Cl. 250—338 **6 Claims**

1. In combination:

a telescope objective lens forming at least two corrected images by transmitting radiation at both visible and infrared frequencies in a common optical path;

an infrared detector positioned to detect a first image formed by said objective lens at infrared frequencies;

means for observing a second image formed by said objective lens at visible frequencies,



optical means in said common optical path receiving the radiation transmitted by said objective lens, separating said visible frequency radiation from said infrared frequency radiation and nutating said infrared image without nutating said visible image; and

said infrared detector having means to detect said nutated infrared image and to provide a measure of an angular relationship between said first and second images with respect to the axis of said common optical path.

3,989,948

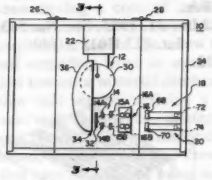
DUAL BEAM OPTICAL SYSTEM

Robert William Allington, Lincoln, Nebr., assignor to Instrumentation Specialties Company, Lincoln, Nebr.

Filed June 9, 1975, Ser. No. 585,190

Int. Cl.² G01J *1/42*; G01N *21/26*

U.S. Cl. 250—373 **46 Claims**



1. Apparatus for directing light from a light source into a plurality of paths, comprising:

a light member having first and second surfaces;

said light-radiating member being positioned to receive light from said light source with substantial light intensity on at least a first spot on said first surface of said light-radiating member;

said light-radiating member being capable of passing light from said first spot on said first surface to a second spot on said second surface, whereby a substantial amount of light is radiated from said second spot by said light-radiating member;

said light-radiating member including light-radiating means for radiating light along at least a first and a second of said paths from said second spot in response to said light from said light source with a substantially constant ratio of the intensity of the light in said first path to the intensity of the light in said second path, which ratio is substantially independent of fluctuations in the light of said light source;

light-beam-forming means for transmitting light from the second spot on said light-radiating member into said plurality of paths;

said light-beam-forming means being on the opposite side of said light-radiating member from said first spot.

3,989,949

LIQUID OXYGEN COMPATIBLE BIODEGRADABLE DYE PENETRANT AND METHOD OF DYE

Orlando G. Molina, Westminster, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 444,433, Feb. 21, 1974, Pat. No. 3,915,886, and a continuation-in-part of Ser. No. 521,730, Nov. 7, 1974, Pat. No. 3,939,092, and a continuation-in-part of Ser. No. 535,262, Dec. 23, 1974. This application May 15, 1975, Ser. No. 577,958

Int. Cl.² G01N *21/16*

U.S. Cl. 250—302 **35 Claims**

19. A method for detecting cracks and flaws in the surface of an object which comprises applying to said surface a biodegradable liquid dye penetrant composition comprising (1) a biodegradable nonionic surfactant which consists essentially of ethoxylates of linear secondary aliphatic alcohols, with the hydroxyl groups randomly distributed, the linear aliphatic portion of said alcohols being a mixture of alkyl chains containing in the range from 10 to 17 carbon atoms, and containing an average of from 3 to 12 moles of ethylene oxide, (2) a small amount of a dye soluble in said surfactant and (3) a major proportion of a halocarbon solvent having a boiling point below about 260° F at atmospheric pressure and being a solvent for said surfactant and said dye, permitting said halocarbon solvent to evaporate, removing excess dye penetrant composition from said surface without removing said dye penetrant composition from said cracks and flaws in said surface, the remaining dye penetrant residue being rendered non-reactive to liquid oxygen upon evaporation of said solvent, and viewing the surface of said object under lighting conditions to obtain colored traces from the dye in said cracks and flaws.

3,989,950

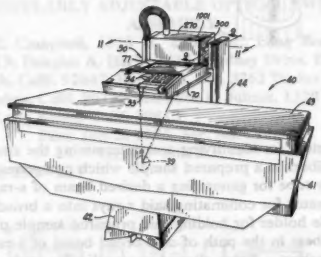
X-RAY SPOT FILMER

Robert P. Hunt, Chesterland, and Eugene V. Brinkman, Hudson, both of Ohio, assignors to Picker Corporation, Cleveland, Ohio

Filed Oct. 7, 1974, Ser. No. 512,974

Int. Cl.² G03B *41/16*

U.S. Cl. 250—468 **17 Claims**



1. A method of taking radiographs using an X-ray spot filmer, comprising the steps of:

a. feeding a sheet of unexposed film along a first feed path from an unexposed film magazine to an exposure station;

b. subsequently exposing the film sheet at the exposure station;

c. reverse feeding the exposed film sheet along portions of said first feed path;

d. moving a movable film guide into position along said first feed path to divert the exposed film sheet during reverse

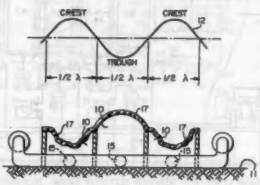
feeding out of said first feed path and along a second feed path into an exposed film magazine.

3,989,951

WAVE ENERGY POWER GENERATING BREAKWATER

Laban E. Lesster, and Robert Etkins, both of Crofton, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 29, 1975, Ser. No. 572,816
Int. Cl.² F03B 13/10, 13/12
U.S. Cl. 290—53 4 Claims



1. Apparatus utilizing energy of waves from a body of water comprising:

a plurality of stationary contractible-expandible submerged pneumatic cells disposed beneath the surface of such body of water,

supply conduit means,

return conduit means,

compressible fluid motor means having an inlet and an outlet open to said supply and return conduit means, respectively,

a first plurality of one-way-flow means communicating said supply conduct means with said pneumatic cells, respectively, and

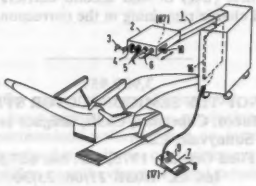
a second plurality of one-way-flow means communicating said return conduit means with said pneumatic cells, respectively.

3,989,952

DENTAL APPARATUS

Eugen Hohmann, Heppenheim, Germany, assignor to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Aug. 2, 1974, Ser. No. 494,273
Claims priority, application Germany, Aug. 6, 1973, 2339827
Int. Cl.² H02B 1/04
U.S. Cl. 307—38 15 Claims



1. In a dental apparatus including a plurality of handpieces; an electrical appliance operatively associated with respectively each said handpiece; and adjusting means for varying the operating voltage supplied to each said appliance so as to change the operative condition thereof, the improvement comprising: a single electrical supply module including a control circuit, said module having an input connected to a voltage supply source and an output connectable to said electrical appliances, said adjusting means including a single foot-controllable adjusting element positioned in the control circuit of said electrical supply module for varying the output voltage of said module between a minimum and a maximum value; switch means connected to each said electrical appliance which, in dependence upon the use of a particular handpiece, selectively connect a respective one of said appliances with the output of said electrical supply module; and means in said electrical supply module for delivering a required operating voltage to the respective switched-in appliance so as to impart the desired operative condition to said appliance.

3,989,953

STORAGE ELEMENT FOR A DIGITAL PERMANENT STORAGE (MEMORY SYSTEM)

Dieter Fischer, Frankfurt am Main, Germany, assignor to Battelle-Institut e.V., Frankfurt am Main, Germany

Filed Aug. 27, 1975, Ser. No. 608,259
Claims priority, application Germany, Aug. 27, 1974, 2440907
Int. Cl.² G11B 9/00
U.S. Cl. 307—88 ET 3 Claims

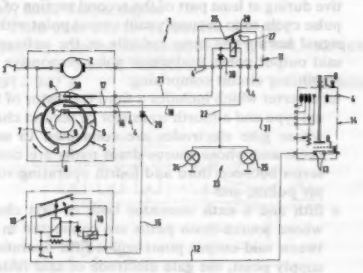
1. A storage element for a digital permanent storage system having a field effect transistor, the semiconductor layer of said field effect transistor being changeable in its electrical conductivity in dependence on the state of the storage of a storage medium, characterized in that said storage medium consists of an electret foil, a field effect transistor which is located on one side of said electret foil and which has been applied directly using the thin-film technique, and a glow gap on the opposite side of said electret foil and which is disposed in such a way, that in case of its ignition, depending on the polarity of the ignition voltage, the state of the charge on the side of said electret foil facing said glow gap is changed as a result of which the electrical field penetrating said semiconductor layer of said field effect transistor is changed and thus the conductivity of said semiconductor layer is changed.

3,989,954

ELECTRICAL CIRCUIT FOR SWINGABLE HEADLIGHTS OF A MOTOR VEHICLE

Hans Weiner, Muhlacker, Germany, assignor to Porsche Aktiengesellschaft, Germany

Filed Oct. 16, 1975, Ser. No. 623,050
Claims priority, application Germany, Oct. 16, 1974, 2449155
Int. Cl.² H02G 3/00
U.S. Cl. 307—10 LS 10 Claims



1. Electrical circuit for swingable headlights of a motor vehicle comprising an electric motor for positioning the headlights and a multi-step switch for initiating the movements of the motor for positioning the headlights, contact-disk means

coupled to the electric motor for controlling the end positions of the headlights, first relay means and second relay means being connected to the multi-step switch, the multi-step switch being provided with at least two step positions whereby the second relay means is energized in dependence upon at least one of the step positions of the multi-step switch and by means providing a voltage drop, the motor being driven in response to the energization of the second relay means.

3,989,955

LOGIC CIRCUIT ARRANGEMENTS USING INSULATED-GATE FIELD EFFECT TRANSISTORS

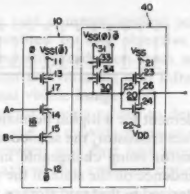
Yasoji Suzuki, Kanagawa, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Division of Ser. No. 400,538, Sept. 25, 1973, abandoned. This application Mar. 18, 1976, Ser. No. 668,056

Claims priority, application Japan, Sept. 30, 1972, 47-97682; Nov. 11, 1972, 47-112557

Int. Cl.[2] H03K *19/08, 19/20, 19/34, 19/36*

U.S. Cl. 307—205 **4 Claims**



1. A logic circuit arrangement using insulated gate field effect transistors each provided with a source-drain path and gate electrode, comprising:

a first transistor of first channel type and having its source-drain path connected between a first operating voltage supply point and an output point and its gate electrode supplied with a first clock pulse, said first transistor being rendered conducting during the first section of the cycle of the clock pulse and rendered nonconducting during the second section of said clock pulse cycle following said first section;

a logic gate including at least two second transistors of second channel type opposite to said first channel type, said at least two second transistors having their source-drain paths connected in series between said output point and a second operating voltage supply point, said second transistors having their gate electrodes respectively supplied with data input; and

a four transistor clock pulse responsive operation stabilizing circuit means connected to said output point and operative during at least part of the second section of said clock pulse cycle so as to supply said output point with a voltage signal having the same polarity as the voltage signal at said output point, said clock pulse responsive operation stabilizing circuit comprising:

an inverter which includes a third transistor of first channel type and a fourth transistor of second channel type whose gate electrodes are connected to said output point and whose source-drain paths are connected in series between third and fourth operating voltage supply points; and

a fifth and a sixth transistor both of first channel type whose source-drain paths are connected in series between said output point and a fifth operating voltage supply point, the gate electrode of said fifth transistor being connected to the junction of the source-drain paths of said third and fourth transistors, and the gate electrode of said sixth transistor being supplied with a second clock pulse;

said third, fourth, fifth and sixth transistors being the only transistors included in said stabilizing circuit.

3,989,956

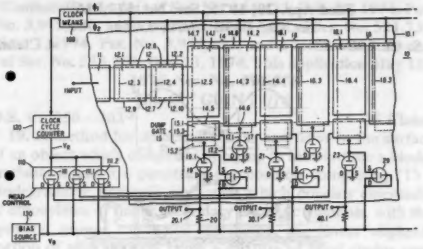
CHARGE TRANSFER BINARY COUNTER

Robert Henry Walden, New Providence, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of Ser. No. 470,550, May 16, 1974, abandoned. This application Apr. 18, 1975, Ser. No. 569,273

Int. Cl.[2] H01L *27/10;* **H03K** *25/02, 23/30*

U.S. Cl. 307—221 D **18 Claims**



1. In a charge transfer binary counter for counting the number of signal pulses in a particular time interval up to a maximum of $2^n - 1$ pulses in the interval, a device comprising:

a charge storage medium,

a quantizer comprising first electrode means for forming in said medium at least one charge storage cell adapted to generate a predetermined packet of charge in response to each of said signal pulses,

second electrode means for forming in said tandem medium a plurality *n* of charge storage threshold cells coupled in tandem with one another and at least one of which is disposed to receive charge transferred out of said quantizer,

means for applying clock voltages to said first and second electrode means,

each of said threshold cells having at its input a first potential barrier across which virtually all charge transferred out of a preceding cell will transfer into said threshold cell upon the application of clock voltage from said applying means to said second electrode means and having at its output a second potential barrier, the area of each threshold cell and the height of its second barrier being mutually adapted in relation to the clock voltage so that charge transfer across the second barrier occurs only when two of said charge packets are transferred into said threshold cell, and

feeback means responsive to charge transferred across any of the first (n-1) of said second barriers for removing residual charge remaining in the corresponding threshold cells.

3,989,957

COUNT-OF-TEN SEMICONDUCTOR STRUCTURE

Patrick A. Tucu, Cupertino, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

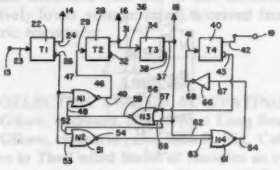
Filed Oct. 31, 1975, Ser. No. 627,554

Int. Cl.[2] H03K *21/06, 23/30*

U.S. Cl. 307—226 R **3 Claims**

1. In a count-by-ten divider of the type having an input and an output and utilizing plural divide-by-two circuits, plural NOR gates and an inverter, the divider comprising, first, second, third, and fourth divide-by-two logic circuits each having signal input, signal output and signal complement output terminals, first, second, third and fourth NOR gates having first and second input terminals and an output terminal, an inverter having input and output terminals, said first divide-by-two signal input being connected to said divider input, and said signal complement output being connected to the first input of said first NOR gate and the second input of said second NOR gate, said output of said first NOR gate being

connected to the signal input of said second divide-by-two circuit and the signal output of said second divide-by-two circuit being connected to the signal input of the third divide-by-two circuit, said third divide-by-two signal output being connected to the second input of the third NOR gate and the first input of the fourth NOR gate, said output of said fourth NOR gate being connected to the inverter input with the



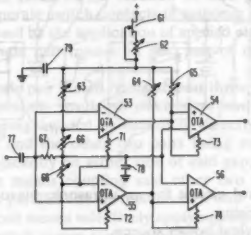
inverter output connected to the signal input of said fourth divide-by-two circuit, said fourth divide-by-two signal complement output being connected to the first input of the third NOR gate and the first input of the second NOR gate, the output of said third NOR gate being connected to the second input of said first NOR gate, and the output of said second NOR gate being connected to the second input to said fourth NOR gate.

3,989,958

LOW CURRENT DRAIN AMPLIFIER WITH SENSITIVITY ADJUSTMENT MEANS

Alexis C. M. Renirie, Nijmegen, and Godefridus J. M. Weijs, Arnhem, both of Netherlands, assignors to Vitatron Medical B.V., Dieren, Netherlands

Filed Aug. 28, 1975, Ser. No. 608,587
Int. Cl.² H03K 5/20
U.S. Cl. 307—235 N **12 Claims**



1. An amplifier circuit for amplifying both positive and negative-going input signals and for producing an output signal of a predetermined polarity when an input signal exceeds a predetermined magnitude, comprising:

a. a first amplifier stage having two input terminals and an output terminal;

b. an input circuit connected to a first of said input terminals, for connecting said input signals to said first amplifier stage;

c. current source means for providing a predetermined source of current;

d. first connecting means for connecting said current source to the second of said input terminals;

e. comparator means for comparing the output of said first stage with at least one predetermined reference, having first and second comparator stages, each such comparator stage having a respective input terminal and bias terminal;

f. second connecting means, connecting said first stage output to said second stage input terminals so that said comparator stages are driven in opposite polarity modes; and

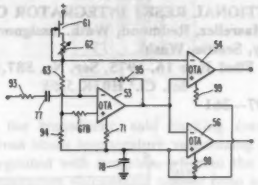
g. third connecting means connecting said current source means to the bias terminals of said second stages.

3,989,959

LOW CURRENT DRAIN AMPLIFIER INCORPORATING FEEDBACK MEANS FOR ESTABLISHING SENSITIVITY

Alexis C. M. Renirie, Nijmegen; Godefridus J. M. Weijs, Arnhem, and Jan P. Schuimer, Dieren, all of Netherlands, assignors to Vitatron Medical B.V., Dieren, Netherlands

Filed Aug. 28, 1975, Ser. No. 608,588
Int. Cl.² H03K 5/20
U.S. Cl. 307—235 N **7 Claims**



1. An amplifier circuit, for amplifying input signals and for producing an output signal of a predetermined polarity when said input signal exceeds a predetermined magnitude, comprising:

a. a first input stage, having a differential input amplifier having first and second inputs and an output with a feedback circuit from the amplifier output to said first input of the amplifier;

b. two output comparator stages, each having a negative input terminal and a positive input terminal;

c. a connection circuit connecting the output of said input stage to respective opposite polarity input terminals of said two output comparator stages;

d. current source means for providing a source of current;

e. an input circuit for connecting input signals to one of said first and second amplifier inputs of said first stage; and

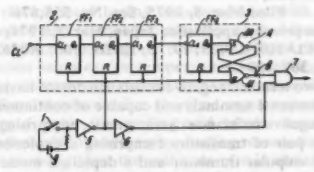
f. a sensitivity connection circuit connecting said current source to said second amplifier input of said first stage and to the respective other terminals of each comparator stage.

3,989,960

CHATTERING PREVENTIVE CIRCUIT

Yukuo Kodama, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Filed June 23, 1975, Ser. No. 589,081
Claims priority, application Japan, June 29, 1974, 49-74693
Int. Cl.² H03K 17/16
U.S. Cl. 307—247 A **5 Claims**



1. A chattering prevention circuit comprising a circuit for generating a switching signal including a chattering signal, a

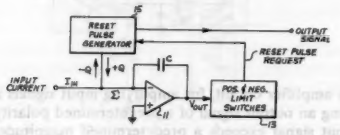
source of clock pulses, a counter circuit connected to said source of clock pulses and coupled with said switching signal generating circuit, said counter circuit starting to count said clock pulses in response to said switching signal and continuing to count said clock pulses at least for a period of time during which said chattering signal is included in said switching signal, means connected to said counter circuit for generating a gate signal after said period of time, a gate circuit connected to the output of said gate signal generating means, an output terminal connected to said gate circuit, said gate circuit passing said switching signal during the presence of said gate signal to said output terminal, whereby the switching signal from which said chattering signal is removed is obtained at said output terminal.

3,989,961

BIDIRECTIONAL RESET INTEGRATOR CONVERTER

C. Johan Masreliez, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed June 16, 1975, Ser. No. 587,157
Int. Cl.² H03K *5/08*
U.S. Cl. 307—261 **16 Claims**



1. In a reset integrator converter wherein the output of an integrator is sensed and a reset pulse request created when the magnitude of said output reaches a predetermined level, the improvement comprising a bi-directional reset pulse generator, said bi-directional reset pulse generator comprising:

a. a bi-directional current path means for supplying a charge of either positive or negative polarity to the input of said integrator, said bi-directional current path means primarily formed of common components; and,

b. control means for:

i. controlling the flow of current in said bi-directional current path means in accordance with the nature of the input to said integrator;

ii. receiving said reset pulse request; and,

iii. connecting said bi-directional current path means to the input of said integrator so as to apply a reducing charge to said integrator for a predetermined time period.

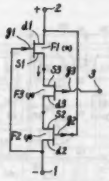
3,989,962

NEGATIVE-RESISTANCE SEMICONDUCTOR DEVICE

Hiromitsu Takagi, Muko, and Gota Kano, Nagaoka-kyo, both of Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan

Filed Mar. 5, 1975, Ser. No. 555,676
Claims priority, application Japan, Mar. 8, 1974, 49-27538
Int. Cl.² H03K *4/83*, *17/72*; H02H *9/00*; H03K *3/353*
U.S. Cl. 307—304 **8 Claims**

1. A two terminal negative resistance device having first and second external terminals and capable of continuously changing its negative resistance characteristic, comprising a complementary pair of transistors comprising a depletion mode n-channel unipolar transistor and a depletion mode p-channel unipolar transistor, an active circuit element having at least two terminals and an input and functioning to change its resistance between said two terminals in response to an input signal, each of said unipolar transistors having a gate and a pair of source-drain output circuit terminals, one of the output circuit terminals of said p-channel unipolar transistor being connected by a first connection to one of said two terminals of said active circuit element, one of the output circuit terminals of said n-channel unipolar transistor being connected by a second connection to the other of said two terminals of said active circuit element, the gates of each of said unipolar transistors being connected by respective third and fourth connections to the other output circuit terminal of the other unipolar transistor, and said third and fourth connections being respectively connected to said first and second external terminals, whereby changing resistance of the active circuit element in response to an input signal changes the negative resistance characteristic of said negative resistance device.

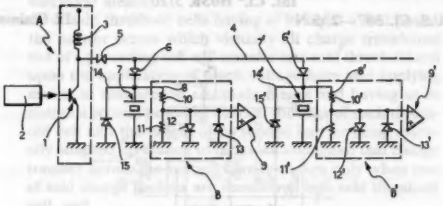


3,989,963

CONTROL CIRCUITS FOR PIEZO ELECTRIC TRANSDUCERS

Eraldo Giaccardi, Turin, Italy, assignor to Fiat Societa per Azioni, Turin, Italy

Filed May 28, 1975, Ser. No. 581,512
Claims priority, application Italy, Aug. 1, 1974, 69441/74
Int. Cl.² H01L *41/04*
U.S. Cl. 310—8.1 **4 Claims**



1. A control circuit for an ultrasonic piezoelectric transducer comprising:

a. an electrical power source,

b. a power transistor,

c. an induction coil connected in series between the collector-emitter junction of said power transistor and said power source,

d. timing circuit means connected to the base of said power transistor for cyclically rendering said power transistor conductive and non-conductive, said induction coil generating a high voltage pulse signal as said transistor is rendered non-conductive,

e. a piezoelectric transducer,

f. a power line coupling the junction between the collector of said power transistor and said induction coil to said piezoelectric transducer,

g. a zener diode connected in series in said power line between said junction and said piezoelectric transducer, said zener diode being poled to be reverse biased by direct current from said power source via said induction coil to thereby prevent the passage of current to said piezoelectric transducer except upon the generation of said high voltage pulse signal as said power transistor is rendered non-conductive by said timing circuit,

h. a decoupling diode connected in series in said power line between said zener diode and said piezoelectric transducer, and

i. a series combination comprising a switching diode and a first resistor, said combination being connected in parallel with said piezoelectric transducer, said switching diode having an impedance such that it is forward biased to pass current from said high voltage pulse signal generated by said induction coil but is not forward biased by a relatively lower voltage signal received from said piezoelectric transducer.

3,989,964

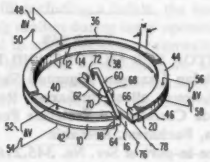
PIEZOELECTRIC SWITCH ACTIVATING MEANS

Emanuel Gikow, deceased, late of West Long Branch, N.J. by Ida M. Gikow, executrix, and John R. Vig, Colts Neck, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 5, 1976, Ser. No. 602,176

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.1 **14 Claims**



1. An electrical switch activating means comprising a transducer element which deforms when subject to an applied electrical potential, said element being in the form of a body member bounding an inner open space and having a gap therein at one point, having a pair of opposed major faces and a pair of end faces at the location of said gap and being adapted to operate switch contacts in response to gap spacing variation caused by the application of applied electrical potential to electrode pair means on said pair of opposed major faces,

said electrode pair means being at least three pairs of mutually electrically insulated electrodes, one pair of electrodes being located substantially directly across from said gap and the other two pairs being respectively located adjacently on either side of said gap;

first circuit means coupling said other two pairs of electrodes in parallel circuit relationship; and

second circuit means selectively applying respective electrical potentials across said one pair of electrodes and said other two pairs of electrodes in parallel for causing said gap to change spacing in first and second directions.

3,989,965

ACOUSTIC TRANSDUCER WITH DAMPING MEANS

Richard W. Smith, and Gerald E. Adamson, both of Richland, Wash., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 27, 1973, Ser. No. 383,202

Int. Cl.² H01L *41/08*

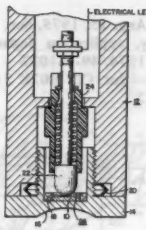
U.S. Cl. 310—8.2 **1 Claim**

1. An acoustic transducer having improved damping characteristics comprising:

an enclosed housing having a portion of one wall constructed of acoustically conductive material effectively forming an acoustic window;

a piezoelectric element having a first and second surface of corresponding opposite polarities positioned within said housing, the first of said surfaces, being in acoustic communication with the acoustic window;

a resilient, elastomeric, electrically conductive, acoustically damped backing member in electrical communication with said second surface of said piezoelectric element making electrical contact substantially over the entire continuous surface area thereof in a manner to promote electrical communication with the surface area of said second surface in the event of cracking and effect ring-



down of the transducer, said backing member being formed from room temperature vulcanizing silicon rubber impregnated with tungsten, wherein the tungsten to room temperature vulcanizing rubber ratio is at least six to one by weight; and

means for electrically coupling said backing member to the exterior of said housing.

3,989,966

APPARATUS FOR CIRCULATING COOLING AND LUBRICATING LIQUIDS AND THE LIKE PARTICULARLY AFTER SHUTDOWN OF THE APPARATUS

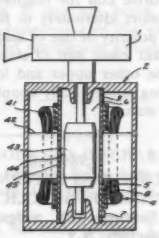
Wilhelm Blank, Speichersdorf, Germany, assignor to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Germany

Filed Mar. 25, 1974, Ser. No. 454,295

Claims priority, application Germany, Mar. 27, 1973, 2315191

Int. Cl.² H02K *11/00*

U.S. Cl. 310—68 C **12 Claims**



1. An electromotor having associated therewith a pump driven thereby and arranged to circulate around the rotor of the electromotor a cooling and lubricating liquid which becomes viscous below certain temperatures, comprising a tubular housing substantially coaxial with and surrounding said rotor to form therearound a chamber communicating with said pump; a stator surrounding said tubular housing and separated from said rotor thereby; heating means disposed in spaced relationship from the coil ends of said stator and located around said tubular housing in close heat relationship therewith, whereby said heating means is substantially unaffected by the thermal conditions developing on said coil ends and is operable to decongeal the cooling and lubricating liquid in said chamber; and a temperature sensing means mounted in

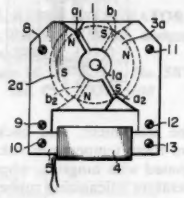
close heat transfer relationship with said tubular housing and adapted to monitor and signal the temperature of the cooling and lubricating liquid inside said tubular housing.

3,989,967

PULSE MOTOR

Akira Kikuyama; Nobuo Toyama, and Shigekazu Takahashi, all of Ena, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Aug. 25, 1975, Ser. No. 607,248
Claims priority, application Japan, Aug. 28, 1974, 49-98650; Aug. 12, 1974, 49-141027
Int. Cl.² H02K 21/12
U.S. Cl. 310—112 12 Claims



1. A pulse motor comprising:

a rotor having at least two magnetization axes extending parallel to the axis of rotation of said rotor and spaced apart at a uniform angular interval, the direction of magnetization of each said magnetization axis being opposite to that of the adjacent magnetization axis;

a pair of upper stators extending above said rotor and defining two upper gaps, said upper gaps being adapted to face different poles different in polarity on the upper side of said rotor;

a pair of lower stators extending below said rotor and defining two lower gaps, said lower gaps being adapted to face different poles different in polarity on the lower side of said rotor, said upper pair of stators and said lower pair of stators coupled together with said rotor sandwiched thereinbetween; and

at least a first drive coil for magnetizing said upper and lower pair stators alternately to the opposite polarities such that the polarity of one of said upper pair of stators and one of said lower pair of stators is opposite to the polarity of the other upper and lower stator, said first drive coil being magnetically coupled to said upper and lower pair of stators.

3,989,968

PUMPED DOUBLE-PASS RETURN LIQUID METAL COLLECTOR FOR ACYCLIC MACHINES

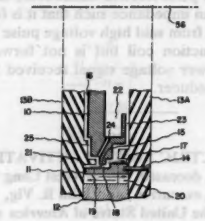
Burton D. Hatch, Saratoga, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 23, 1975, Ser. No. 625,168
Int. Cl.² H01R 39/00
U.S. Cl. 310—219 15 Claims

1. In an acyclic machine including a rotor collector ring rotatable within a stator collector ring, apparatus providing a continuous electrical current path therebetween comprising:

an intermediate collector electrode situated between said rotor collector ring and stator collector ring, said intermediate collector electrode carrying a plurality of pairs of radially-outwardly-directed vanes, alternate pairs of said vanes extending axially from axially opposite sides of said electrode for less than the entire axial width of said electrode;

an insulating coating covering the entire surface area of said electrode except for a circumferentially-oriented strip on the inner circumferential surface of said electrode and the axially-oriented regions separating successive pairs of vanes on the outer circumferential surface of said electrode; and



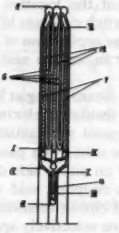
liquid metal situated between said rotor collector ring and said intermediate collector electrode, and situated between said intermediate collector electrode and said stator collector ring.

3,989,969

ROTOR FOR MOTORS AND THE LIKE

Dumitru Felician Lazaroiu; Sigmund Sleiher, and Gheorghe Mihai Mihaiescu, all of Bucharest, Romania, assignors to Institutul de Cercetare si Proietare Pentru Industria Electrotechnica, Bucharest, Romania

Continuation-in-part of Ser. No. 345,216, March 26, 1973, Pat. No. 3,869,788. This application Aug. 12, 1974, Ser. No. 496,740
Int. Cl.² H02K 1/22
U.S. Cl. 310—268 3 Claims



1. A rotor comprising:

a stack of coaxial annular flat insulating outer rings aligned with each other and each having a pair of opposite faces, said stack of outer rings having an outer periphery and an inner periphery;

respective arrays of elongated and generally parallel flat conductors on each of said faces, each of said conductors having an outer end extending beyond said outer periphery and joined therebeyond to an outer end of another conductor, at least every second conductor of each array having an inner end extending inwardly beyond said inner periphery and joined to an inner end of another conductor;

a flat inner annular ring coaxially and spacedly surrounded by said stack and defining a gap therewith; and

commutator bars formed on opposite faces of said inner ring and of a width greater than that of the conductors at their widest points, the joined inner ends of the conductors lying in said gap, said bars being connected to respective nonjoined inner ends of the conductors.

3,989,970

METAL HALIDE HIGH-INTENSITY DISCHARGE LAMP HAVING IMPROVED RESTART CAPABILITY

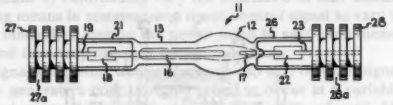
Robert D. Downing, Mentor, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 19, 1974, Ser. No. 534,443

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.² H01J *61/52*

U.S. Cl. 313—42 **6 Claims**



1. A metal halide high-intensity discharge lamp comprising an envelope and at least one electrode structure sealed therein, said electrode structure comprising an elongated refractory metal electrode extending with said envelope and a conductor extending externally of the envelope, said envelope having a gas fill including a halide, the inner end of said electrode becoming molten during lamp operation, and a heat radiator connected to said conductor externally of said envelope for radiating heat into surrounding air so as to aid the cooling of said electrode upon termination of the discharge without substantially affecting the operating temperature of said electrode.

3,989,971

GATEABLE ELECTRON IMAGE INTENSIFIER

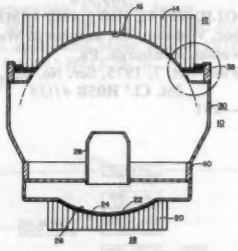
Vincent J. Santilli, Corning, N.Y., and James Vine, Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 29, 1974, Ser. No. 518,859

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² H01J *39/04, 39/02*

U.S. Cl. 313—99 **7 Claims**



1. An electronic imaging tube comprising:

a hermetically sealed envelope;

an input image means including a curved photocathode surface;

output image means spaced from the input image means;

an annular accelerating anode positioned within said envelope between the input and output means for accelerating electrons to produce image intensification;

an annular gateable electrode disposed within said envelope between the input means and the anode, which gateable electrode includes an inwardly disposed end portion proximate to but spaced from the perimeter of the photocathode surface, which end portion extends along the radius of curvature of the photocathode surface.

3,989,972

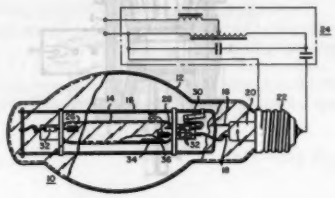
HIGH PRESSURE MERCURY VAPOR DISCHARGE LAMP CONTAINING BISMUTH IODIDE

Daniel A. Larson, Cedar Grove, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 27, 1967, Ser. No. 678,664

Int. Cl.² H01J *61/20*

U.S. Cl. 313—229 **1 Claim**



1. A vapor arc photochemically useful light source comprising:

a. an ultra-violet light transmissive evacuable envelope

b. a pair of arc-electrodes disposed within said envelope and defining therebetween an arc path,

c. a filler within said envelope comprising

1. a quantity of mercury sufficient upon volatilization thereof to establish within said envelope a pressure of mercury vapor sufficient to sustain an arc dicharge between said electrode and raise the inner wall of said envelope to operating temperature

2. a quantity of a halide of bismuth (other than the fluoride) sufficient at lamp operating temperature to produce a partial pressure of bismuth halide sufficient to dissociate in said arc and radiate photochemically useful radiation characteristic of the bismuth atom

3. a quantity of a starting gas sufficient to ionize upon application of operating voltages to said lamp and vaporize said mercury,

4. said quantity of mercury being sufficient to cause collision line-broadening of the emission of said bismuth atom, but insufficient to cause depletion of bismuth halide.

3,989,973

COLD-CATHODE GAS-DISCHARGE DEVICE

Gerhard Lange, and Gerhard Peche, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 203,710, Dec. 1, 1971, abandoned. This application July 31, 1975, Ser. No. 600,810

Claims priority, application Germany, Jan. 22, 1971, 210007

Int. Cl.² H01J *1/46, 17/04, 17/12*

U.S. Cl. 313—201 **1 Claim**

1. A cold-cathode gas-discharge overload voltage device adapted to accommodate a high current load comprising:

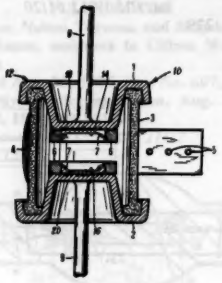
a gas-tight, electrical-insulating housing;

a control electrode attached to and surrounding the outside of said gas-tight housing;

a pair of spaced frustum-shaped main electrodes symmetrically mounted in said gas-tight housing with their frontal surfaces facing each other;

stamped metallic iron rings attached to the frontal surfaces of both main electrodes and said stamped metal rings having sharp edges; and

layers of an activating material adhered to the frontal surfaces of both main electrodes within the metallic rings,



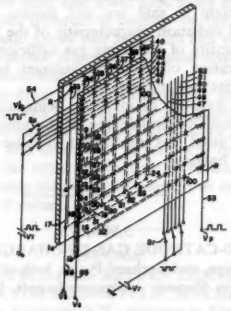
whereby the main electrodes become in effect hollow electrodes.

3,989,974

GAS DISCHARGE DISPLAY PANEL

Hiroshi Tottori; Shigemasa Yoshida; Fumihiko Isogai, and Etsuo Hatabe, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed July 8, 1975, Ser. No. 594,015
Claims priority, application Japan, July 8, 1974, 49-78468
Int. Cl.² H01J 61/06
U.S. Cl. 313—217 8 Claims



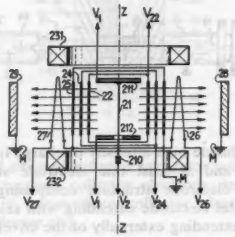
1. A gas discharge display panel comprising:
a display part comprising main electrodes disposed to form a matrix through a discharge gap to form plural picture elements by generating luminescent dots at cross points of the main electrodes; and
a switching operation part comprising:
auxiliary electrodes arranged with the main electrodes to control the initiation and termination of the discharge at selected cross points of the main electrodes, and
switching electrodes respectively arranged to cross the auxiliary electrodes through the discharge gap and to select cross points of the auxiliary electrodes for discharge,
the main electrodes being covered by thin dielectric layers.

3,989,975

ION BOMBARDMENT APPARATUS

Jacques Trotel, Paris, France, assignor to Thomson-CSF, Paris, France

Filed May 13, 1975, Ser. No. 577,107
Claims priority, application France, May 15, 1974, 74.16874
Int. Cl.² H01J 17/26
U.S. Cl. 313—231.3 5 Claims



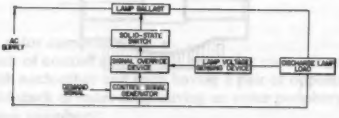
1. An ion bombardment apparatus comprising:
a chamber for containing an inert gas at a selected pressure;
an ion source, comprising:
a cathode comprising a rectilinear heater filament, extending linearly, capable of emitting electrons in all directions perpendicular to itself, and two circular discs centered on said filament and perpendicular to the direction of extension of said filament
an anode, constituted by a first cylindrical grid surrounding said cathode;
a set of cylindrical grids, constituted by a second and third grids, capable of extracting and accelerating the ions produced by said ion source, arranged around said anode;
a series of filaments parallel to said heater filament and arranged in a ring around said set of cylindrical grids; and
a series of mounts for accommodation of specimens to be treated.

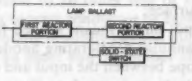
3,989,976

SOLID-STATE HID LAMP DIMMER

James B. Tabor, Wheaton, Ill., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 7, 1975, Ser. No. 620,443
Int. Cl.² H05B 41/38
U.S. Cl. 315—291 5 Claims





1. A lighting control apparatus which is responsive to a variable and controllable demand signal to control the power input to a high-pressure-discharge lamp means and thus vary the light output therefrom while preventing the lamp means from extinguishing because of a too-rapid reduction in power input thereto, said lamp means under normal full-power oper-

ating conditions displaying a predetermined voltage drop thereacross, said apparatus comprising:

a. ballasting means connectable in series with said lamp means and an AC power source, said ballasting means comprising a reactance means variable between a minimum value which causes said lamp means to operate at a maximum light output and a maximum value which causes said lamp means to operate at a minimum light output;

b. solid-state switching means connected to said ballasting means to controllably vary the reactance of said ballasting means in response to a timed control signal to vary in a controlled fashion the power input to said lamp means and thus vary the light output therefrom;

c. signal generating means responsive to said demand signal to generate a control signal timed to occur at a variable and controllable point in each half cycle of said AC power source, the output of said signal generating means connected to the input of said solid-state switching means, and said generated timed control signal rendering said solid-state switching means conductive for a variable and controllable portion of each half cycle of said AC power source;

d. lamp voltage sensing means for developing a feedback signal which varies in accordance with the voltage drop across said lamp means; and

e. signal sensing and overriding means for sensing the magnitude of said feedback signal when said lamp means is operating with less than substantially maximum power input and with a voltage drop thereacross which is greater than the normal predetermined rated operating voltage therefor and for causing said sensed feedback signal to override said control signal and increase the power input to said operating lamp means and thus decrease the voltage drop thereacross, whereby the tendency for said lamp means to extinguish during dimming thereof is compensated for.

3,989,977

COLOR PICTURE TUBE

Shigeya Ashizaki, Takatsuki, Japan, assignor to Matsushita Electronics Corporation, Kadoma, Japan

Filed Mar. 26, 1975, Ser. No. 562,056
Claims priority, application Japan, Apr. 5, 1974, 49-39103
Int. Cl.² H01J *29/20, 29/10*
U.S. Cl. 313—468 **2 Claims**

1. In a cathode ray tube having a vacuum enclosure, a phosphor screen provided on the inner face of a face plate contained within the vacuum enclosure, the phosphor screen provided with a plurality of red, green and blue phosphor dots or strips thereon, and a shadow mask provided inside the vacuum enclosure at a predetermined distance from the phosphor screen, and means for emitting electron beams onto the phosphor screen,

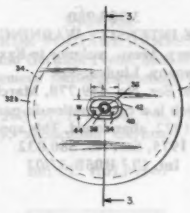
the improvement wherein the red phosphor dots or strips are particles of europium-activated yttrium oxide (Y_2O_3:Eu) having thereon a thin protective coating layer of europium-activated yttrium oxysulfide (Y_2O_2S:Eu) which particle layers when excited both emit a uniform red light.

3,989,978

COUPLED CAVITY TRAVELING-WAVE TUBE WITH OBLONG CAVITIES FOR INCREASED BANDWIDTH

Otto Sauseng, Rolling Hills Estates, and Kenneth A. Estrella, Torrance, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Feb. 20, 1976, Ser. No. 659,811
Int. Cl.² H01J *25/34*
U.S. Cl. 315—3.5 **6 Claims**



1. A traveling-wave tube comprising:

means for providing a beam of electrons along a predetermined axis;

slow wave structure means for propagating electromagnetic wave energy in such manner that it can interact with said beam of electrons, said slow-wave structure means defining a plurality of interaction cavities disposed sequentially along said axis and in electromagnetic interacting relationship with said beam of electrons, each of said cavities having an oblong configuration in a plane perpendicular to said axis, said oblong configuration having a length-to-width ratio of a predetermined value between about 1.2 and about 1.6;

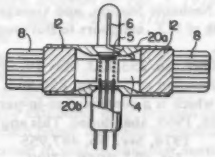
the end walls separating adjacent ones of said cavities defining aligned circular holes in their central regions to provide a passage for said beam of electrons and further defining respective coupling apertures in regions radially outwardly of said central regions for interconnecting adjacent cavities, and each said coupling aperture extending circumferentially about half way around said aligned circular holes.

3,989,979

MAGNETRON EMPLOYING A PERMANENT MAGNET FORMED OF A MANGANESE-ALUMINUM-CARBON SYSTEM ALLOY

Isago Konno, Neyagawa, and Tadao Ohtani, Katano, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed July 29, 1975, Ser. No. 600,130
Claims priority, application Japan, Aug. 3, 1974, 49-89253; Mar. 26, 1975, 50-37106; Mar. 26, 1975, 50-37107
Int. Cl.² H01J *25/50*
U.S. Cl. 315—39.51 **11 Claims**



1. In a magnetron having enclosure member surrounding an interaction space for electrons, an anode and a cathode positioned within said enclosure member, and means for applying a magnetic field to said interaction space, the improvement

wherein said means for applying a magnetic field comprises at least one permanent magnet for supplying magnetic energy to said interaction space and establishing a magnetic field perpendicularly to the electric field established between said anode and said cathode, said permanent magnet being formed of a manganese- aluminum-carbon system alloy and being disposed within said enclosure member or defining part of said enclosure member.

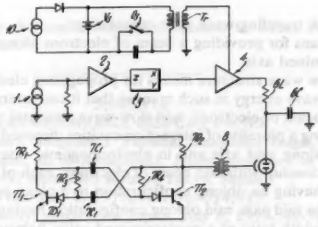
3,989,980
VARIABLE INTENSITY WARNING LIGHT

Elliot Berman, Quincy, Mass., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 449,778, March 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 254,061, May 17, 1972, abandoned. This application May 22, 1975, Ser. No. 580,032

Int. Cl.² H05B *37/02*

U.S. Cl. 315—154 **7 Claims**



1. A light system in which an operating voltage from a voltage source is applied to a lamp whereby the lamp is lighted, such system comprising:

a voltage source;

a lamp;

power regulating means operably connecting said voltage source and said lamp whereby the power from the voltage source is applied to said lamp whereby the lamp is lighted; and

photovoltaic means for generating power proportional to ambient light intensity, said photovoltaic means operably connected to said power regulating means whereby the power generated by the photovoltaic means is applied to said lamp so that the brilliance of the lamp is proportionally increased when the ambient light increases and will proportionally decrease when the ambient light decreases thereby maintaining a nearly constant contrast between the brilliance of the lamp light and the ambient light.

3,989,981
PANEL-TYPE DISPLAY DEVICE

James A. Ogle, Neshanic Station, and George E. Holz, North Plainfield, both of N.J., assignors to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 255,133, May 19, 1972, abandoned, which is a continuation of Ser. No. 850,984, Aug. 18, 1969, abandoned, which is a continuation-in-part of Ser. No. 828,793, May 28, 1969, abandoned. This application July 12, 1974, Ser. No. 487,955

Int. Cl.² H05B *37/00*

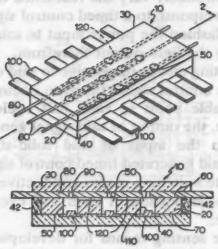
U.S. Cl. 315—169 TV **41 Claims**

1. A display system including

a display panel having a plurality of discrete gas-filled display cells arrayed in rows and columns in a layer and adapted to be energized to display a character or message,

electrode means associated with each display cell for applying potential thereto suitable for ionizing the gas in a cell and thereby causing a cell to ionize and to exhibit glow,

a plurality of particle-supply cells arrayed in rows and column in a second layer in said panel, each particle-supply cell being vertically aligned with a display cell so that it can supply excited particles thereto whereby the turn-on of a display cell is facilitated, and



gas communication paths in said panel between adjacent columns of particle-supply cells through which excited particles diffuse from one cell which is exhibiting glow to another cell which is not exhibiting glow, said particles being present within the gas in said other cell and providing an ionization-assisting force to said other cell to cause said other cell to ionize and exhibit glow when operating potentials are applied to it.

3,989,982
MULTIPLE GASEOUS DISCHARGE DISPLAY/MEMORY PANEL HAVING DECREASED OPERATING VOLTAGES

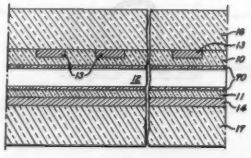
Robert F. Schaufele, Okemos, Mich., assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 67,604, Aug. 27, 1970, Pat. No. 3,846,670. This application Apr. 23, 1974, Ser. No. 463,322 The portion of the term of this patent subsequent to Nov. 5, 1991, has been disclaimed.

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 20, 1976

Int. Cl.² H05B *37/00*

U.S. Cl. 315—169 TV **5 Claims**



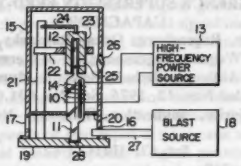
1. In a gaseous discharge display/memory device characterized by an ionizable gaseous medium in a gas chamber formed by a pair of dielectric material bodies having opposed charge storage surfaces, the improvement wherein each dielectric surface is coated with at least one electron emissive substance having a thickness of at least about 100 angstrom units to provide substantially decreased operating voltages without substantially affecting the memory margin of said device, said electron emissive substance being selected from Group IA elements, Group IA oxides, barium, GaAs, GaP, InAs, InSb, InP, NiO, CsF, CsI, AgOCs, and AuOCs.

3,989,983

LIGHT SOURCE APPARATUS

Koichi Uchino, and Hideaki Koizumi, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Jan. 28, 1975, Ser. No. 544,759
Claims priority, application Japan, Jan. 30, 1974, 49-11826
Int. Cl.² H05B 41/16
U.S. Cl. 315—248 39 Claims



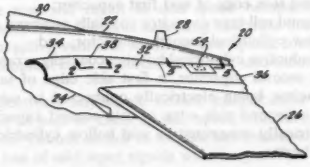
1. A light source apparatus comprising:
at least one electrodeless discharge tube containing at least one element which is capable of emitting light in a vaporized state and inactive gas,
said electrodeless discharge tube including a first discharging portion, a second light emitting portion extending from and in communication with said first discharging portion, and a third portion for containing said element in a non-vaporized state, said third portion being in communication with said first discharging portion;
first means for applying high-frequency energy to said electrodeless discharge tube to excite said element in said vaporized state into light emission, said first means including a high-frequency coil surrounding said first discharging portion; and
second means for maintaining said third portion at a lower temperature than the temperature of both of said first discharging portion and said second light emitting portion.

3,989,984

AIRCRAFT LIGHTNING PROTECTION MEANS

Myron P. Amason, Stanton, and Joseph T. Kung, Long Beach, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed July 11, 1975, Ser. No. 595,047
Int. Cl.² H05F 1/02
U.S. Cl. 317—2 E 16 Claims



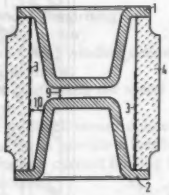
1. For use with structural components of aircraft and other vehicles, lightning protection means comprising:
a layer of dielectric material of predetermined thickness and dielectric strength; and
a layer of metallic material of predetermined thickness and electrical conductivity, said dielectric and metallic layers being affixed together and perforated with openings of predetermined geometry, size and spacing to provide a conformable and lightweight lightning protection means for application to an ordinarily lightning-accessible surface of a structural component to be protected from lightning damage, said dielectric layer being normally affixed to said structural component surface and said metallic layer being accessible to lightning strikes, said metallic layer being of such character that it vaporizes locally when struck by lightning while the rest of said metallic layer transfers the lightning current away from the struck area without damage, and said dielectric layer being of such character that it electrically and thermally isolates said structural component surface to protect it from lightning damage.

3,989,985

SURGE VOLTAGE ARRESTER

Gerhard Lange, and Gerhard Peche, both of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 31, 1974, Ser. No. 493,264
Claims priority, application Germany, Sept. 13, 1973, 2346174
Int. Cl.² H01J 1/46
U.S. Cl. 317—61 8 Claims



1. A surge voltage arrester comprising:
a gas-tight housing including a tube-shaped insulating body having an inner surface;
a pair of electrodes extending into said body and sealed thereto, each of said electrodes including a surface spaced from the like surface of the other electrode to define a gap; and
at least one conductive strip carried on said inner surface of said body,
Said conductive strip extending from one of said electrodes toward the other of said electrodes a distance beyond said gap,
said electrodes disposed with respect to said inner surface such that said conductive strip is spaced from said other electrode a distance greater than the length of said gap.

3,989,986

METAL ENCLOSED SWITCHGEAR HAVING WELL-SHAPED FRONT COVERS

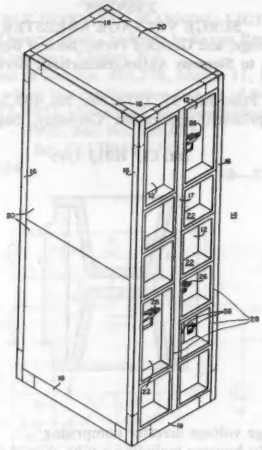
James R. Farley, Pittsburgh; John G. Salvati, and Louis N. Ricci, both of Beaver Falls, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 346,551, March 30, 1973. This application Sept. 26, 1974, Ser. No. 509,606
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² H02B 1/10
U.S. Cl. 317—120 21 Claims

1. A three phase alternating current metal enclosed switchgear unit comprising:
a generally rectangular section structure;
three horizontally extending main through bus bar conductors, one for each phase, disposed horizontally in a spaced apart relationship in said rectangular section;
three vertical riser conductors disposed in said rectangular section in front of said main horizontal through bus conductors;
connector means electrically connecting each phase of said horizontal main through bus to its associated vertical riser;

a plurality of circuit interrupters connected to said vertical risers and recessed from the front of said section structure having operating handles facing and recessed from the front of said section structure and each of said circuit interrupters being disposed vertically upright;

a plurality of circuit-interrupter enclosure means formed at the front of said section structure and each of said circuit interrupter enclosure means having at least one of said circuit interrupters disposed therein and being positioned vertically;



a plurality of front cover means for closing the front of each of said enclosure means so as to provide a dead front construction for said switchgear unit;

each of said front cover means comprising an outer portion aligned with the front of said section structure and which extends around the periphery of said front cover means, and a recessed surface flush with the front of the associated circuit interrupter and having an opening therein through which only the operating handle of the associated circuit interrupter extends; and,

said outer portions of said front cover means include a void formed therein for receiving some mounting hardware associated with said switchgear unit.

3,989,987

ELECTRICAL CAPACITOR HAVING SUPPLY MEMBERS CONNECTED TO THE COATINGS

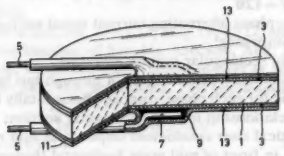
Henricus Hubertus Marie Vorst, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed July 23, 1975, Ser. No. 598,175

Claims priority, application Netherlands, Aug. 20, 1974, 7411079

Int. Cl.² H01G 1/005

U.S. Cl. 317—258 **8 Claims**



1. An electrical capacitor, comprising a dielectric provided with metal coatings, at least one supply member soldered to each of said coatings, the area of said one soldered connection between one of said supply members and a corresponding coating being covered by an additional layer of metal having a smaller specific resistance than the solder, said layer being deposited after the connection has been made, with said metal layer extending over at least the coating in the immediate vicinity of the soldering area.

3,989,988

INTERFERENCE SUPPRESSION FEED-THROUGH CAPACITOR

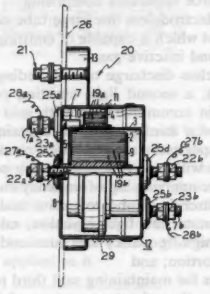
Juergen Puetz, Regensburg; Oskar Rawinsky, Bad Abbach, and Heinz Wagner, Regensburg, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 12, 1975, Ser. No. 631,080

Claims priority, application Germany, Nov. 27, 1974, 2456088

Int. Cl.² H01G 4/42

U.S. Cl. 317—260 **7 Claims**



1. A feed-through capacitor unit adapted for combining minimum terminal conductor inductance with suppression of symmetrical interference components between first and second conductors and asymmetrical interference components between a second conductor and ground, comprising:

a. a central first conductor;

b. a first roll-type capacitor having a first side edge electrically connected to said first conductor;

c. a hollow cylindrical second conductor coaxially arranged about said first capacitor and electrically connected to a second side edge of said first capacitor;

d. a second roll-type capacitor coaxially arranged about said hollow cylindrical second conductor; and

e. a conductive cylindrical housing coaxially arranged about said second capacitor, a first side edge of said second capacitor being electrically connected to said housing and a second side edge of said second capacitor being electrically connected to said hollow cylindrical second conductor.

3,989,989

CONVEYOR OVERSPEED-UNDERSPEED AND/OR SLIP DETECTOR

Gerald C. Mayer, Wayne, N.J., assignor to Litton Systems, Inc.

Filed Apr. 30, 1975, Ser. No. 573,077

Int. Cl.² H02P 5/50

U.S. Cl. 318—72 **16 Claims**

13. A bulk material moving system: comprising

a. a plurality of bulk material moving means;

b. a plurality of input drive means, their being one of said input drive means for each one of said bulk material moving means to provide motive power thereto;

c. a plurality of speed comparitor and equipment control means each operative in a first condition thereof to render an associated piece of equipment operable and each

operative in a second condition thereof to render an associated piece of equipment inoperative;

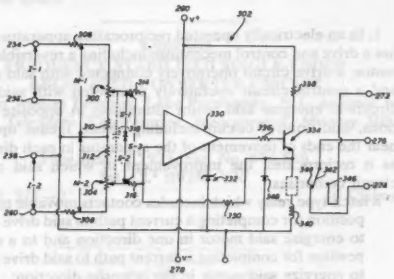
d. a master control means interconnected to each of said speed comparitor and equipment control means and to each of said input drive means to control operation of said input drive means and thereby of said bulk material moving means depending upon said first and said second conditions of said speed comparitor and equipment control means;

e. a plurality of speed responsive signal generating means each of which provides an electrical signal output indicative of the speed of a moving element when disposed for coaction with a moving element;

f. selected ones of said spaced responsive signal generating means being disposed for coaction with selected ones of said input drive means to provide electrical signals indicative of the speeds of said input drive means and selected others of said speed responsive signal generating means being disposed for coaction with selected driven means disposed for coaction with selected ones of said input drive means;

g. each of said speed responsive signal generating means being connected in circuit to a selected one of said speed comparitor and equipment control means to provide an input signal thereto;

h. each of said input signals when so provided being summed, by circuit means included as a part of said speed



comparitor and equipment control means, with either another of said input signals, or with a reference signal from a reference signal source also provided to said speed comparitor and equipment control means such that a positive sum will result in said speed comparitor and equipment control means assuming said first condition, and a negative sum will result in said speed comparitor and equipment control means assuming said second condition;

i. first selectively adjustable circuit modification means included as part of each of said speed comparitor and equipment control means to receive and selectively modify first one of said input signals when so provided to said speed comparitor and equipment control means, and in such a way as to reduce the magnitude thereof with respect to a predetermined reference level to thus establish a percenage acceptable variance for the speed comparitor and equipment control means within which said first condition will obtain and beyond which said second condition will obtain; and

j. second selectively adjustable circuit modification means included as part of each of said speed comparitor and equipment control means to receive and selectively modify a second one of said input signals, when so provided to said speed comparitor and equipment control means, and in such a way as to compensate for variations between circuit components to establish the level at which said second condition will obtain.

3,989,990

FEEDBACK FIELD CONTROL FOR AN ELECTRIC VEHICLE

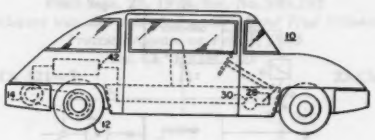
Francis T. Thompson, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 31, 1974, Ser. No. 475,236

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² H02P 5/06

U.S. Cl. 318—139 **15 Claims**



1. An electric vehicle comprising:

a direct current drive motor;

a separately excited field winding disposed within said direct current drive motor;

throttle means for controlling the speed of said direct current drive motor;

armature current feedback means connected to said direct current drive motor to provide a feedback signal proportional to the armature current flowing through said direct current drive motor;

armature current reference means connected to said throttle providing an armature demand reference signal dependent on the position of said throttle;

error amplifier means connected to said armature current feedback means and said armature current reference means for comparing the armature feedback signal and the armature demand reference signal and providing a field demand signal depend on the difference between the feedback signal and the reference signal;

field current output amplifier means connected to said error amplifier and said separately excited field winding providing current flow through said separately excited field winding in response to the error signal received from said error amplifier means;

armature demand reference signal reducing means connected to said armature current to said armature current reference means for providing a modified armature demand reference signal when activated;

speed detector means connected to detect the speed of said direct current drive motor and to provide a signal proportional to the direct current drive motor speed; and,

said speed detector means being connected to said armature demand reference signal reducing means for reducing the armature demand reference signal when the speed of said direct current drive motor exceeds a predetermined value.

3,989,991

METHOD AND CIRCUIT FOR THE DERIVATION OF AN ANALOG SLIP FREQUENCY SIGNAL OF AN INDUCTION MOTOR IN A TACHOMETERLESS MOTOR DRIVE

Michael B. Brennen, and Alberto Abbondanti, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 3, 1974, Ser. No. 511,886

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² H02P 7/42

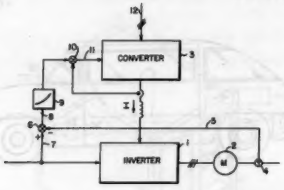
U.S. Cl. 318—231 **5 Claims**

1. The method of determining the slip frequency ω_s of an induction motor supplied with current at a frequency ω_1 and imparting a torque T to a load, comprising the steps of:

sensing the value of the input current and the input voltage of the stator of the motor;

determining from said sensed current and voltage values the direct and quadrature input currents I_d, I_q; and voltages V_d, V_q;

determining E_d and E_q, the direct and quadrature air gap voltages in accordance with the relationship $E_d = V_d - I_d(R_1 + j\omega_1 L_1)$ and $E_q = V_q - I_q(R_1 + j\omega_1 L_1)$, where R_1 and L_1 are the resistance and inductance of the stator of the motor;



computing at least one of the products $E_d \cdot I_d$ and $E_q \cdot I_q$ to derive a signal N which is substantially proportional to $T\omega_1$;

integrating at least one of said determined direct and quadrature air gap voltages, E_d and E_q;

multiplying said integrated one of said air gap voltages by the other of said determined air gap voltages to derive a signal D which is substantially proportional to the square of the corresponding non-integrated determined air gap voltages and inversely proportional to ω_1; and

dividing said signal N by said signal D to derive a signal representative of the slip frequency ω_2.

3,989,992

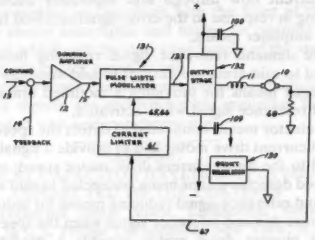
PULSE WIDTH MODULATED CONTROL SYSTEM

Robert H. Schmidt, Minnetonka, Minn., assignor to Electro-Craft Corporation, Hopkins, Minn.

Filed Mar. 10, 1975, Ser. No. 556,653

Int. Cl.² H02P *1/22*

U.S. Cl. 318—257 **7 Claims**



1. In apparatus of the class above described, the combination comprising;

a. a source of pulse width modulated signals of opposite polarity and variable width;

b. load means to be reversibly driven thereby;

c. first and second current controlling means having input terminals connected to said sources of signal in a complimentary configuration;

d. a first source of electric current of one polarity;

e. a second source of electric current of opposite polarity; one of said sources of electric current having a higher potential than the other; and

f. switching means connected to said current controlling means so that actuation of one current controlling means causes one of said sources of electric current to be connected to energize said load means and actuation of the other of said current controlling means causes the other of said sources to be connected to said load means.

3,989,993

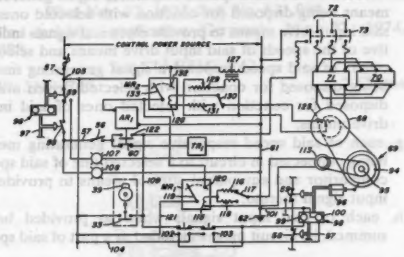
DRIVE AND CONTROL MECHANISM FOR ELECTRICALLY OPERATED RECIPROCATING APPARATUS

Roy D. Ewing, Richardson, Tex., assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Dec. 6, 1974, Ser. No. 530,316

Int. Cl.² H02P *7/20*

U.S. Cl. 318—282 **23 Claims**



1. In an electrically operated reciprocating apparatus which has a drive and control mechanism including a reversible drive motor, a drive circuit operatively connected with said motor, and a control circuit operatively connected with said drive circuit to energize said motor alternately in opposite directions, said control circuit including switch means operated near the ends of movement of the apparatus in each direction as it reciprocates, the improvement in which said control circuit comprises:

a latch-type relay which includes contacts movable to a first position for completing a current path to said drive circuit to energize said motor in one direction and to a second position for completing a current path to said drive circuit to energize said motor in the opposite direction;

said relay including an operating coil operatively connected with said switch means for moving said contacts to their first position following operation of said switch means near the end of movement of the apparatus in one direction, means for latching said contacts in their first position and a reversing coil operatively connected with said switch means for releasing said latching means and moving said contacts to their second position following operation of said switch means near the end of movement of the apparatus in the other direction; and

directional control means operatively connected with said relay for starting said apparatus moving in a predetermined direction depending on the positon of the apparatus at the time it is started.

3,989,994

SPACE ORIENTED MICROWAVE POWER TRANSMISSION SYSTEM

William C. Brown, Weston, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Aug. 9, 1974, Ser. No. 495,960

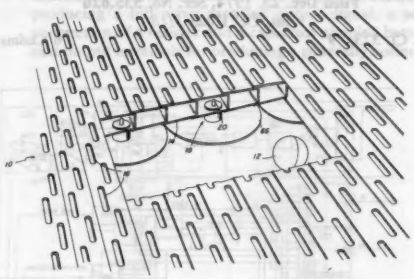
Int. Cl.² H02M *7/00*

U.S. Cl. 321—1.5 **4 Claims**

1. In a space oriented system and apparatus for converting solar energy into electrical power including means for converting dc energy into microwave energy, an active phased antenna array for wireless transmission of said microwave energy as a microwave beam directed to earth-based collection and electrical power conversion means comprising:

a plurality of wave transmission line means having energy radiating elements;

an array of a plurality of cascaded dc-to-microwave energy converters adapted to become operative upon injection of a microwave input signal to produce an amplified



output signal at a predetermined microwave frequency; and

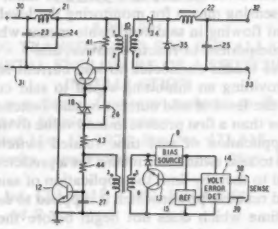
means for directly coupling each of said energy converters to said transmission line means to radiate a microwave beam having a predetermined phase front pattern into free space.

3,989,995

FREQUENCY STABILIZED SINGLE-ENDED REGULATED CONVERTER CIRCUIT

William Anders Peterson, Lake Parsippany, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 5, 1975, Ser. No. 574,560
Int. Cl.² H02M 7/20
U.S. Cl. 321—2 **10 Claims**



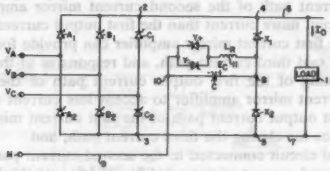
1. A converter circuit comprising a transformer including a primary winding, a secondary winding, and a regenerative feedback winding, means to accept a voltage source, switching means connected to couple said means to accept to said primary winding, drive means to initiate conduction in said switching means, output means coupled to said secondary winding, means to monitor an output signal at said output means, means to generate an error signal responsive to the deviation of the output signal from a desired magnitude, capacitive energy storage means responsive to said regenerative feedback winding and charging in response to conduction of said switching device, bias means responsive to the charge on said capacitive energy storage means to terminate conduction in said switching means at a particular final charge threshold level, and means responsive to said means to generate an error signal to establish an initial charging threshold level at which said capacitive energy storage means begins charging toward said particular threshold by controlling the voltage across said regenerative winding to be a function of said error signal during nonconduction of said switching device whereby the charging interval of said capacitive energy storage means is proportional to the error signal.

3,989,996

FORCE COMMUTATION STATIC FREQUENCY CHANGER APPARATUS USING DIRECT CAPACITOR COMMUTATION

Eric J. Stacey, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 25, 1974, Ser. No. 509,185
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² H02M 5/45
U.S. Cl. 321—7 **23 Claims**



2. A force commutation static frequency changer for supplying with alternating current a load from a polyphase alternating current source via cyclically and temporarily conductive main controllable rectifiers associated in pairs with the respective phases of the alternating current source comprising:

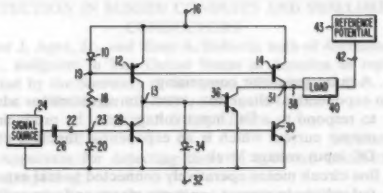
capacitor means in series combination with auxiliary controllable rectifier means for applying a predetermined voltage in the reverse direction with respect to any of said main controllable rectifiers and for establishing a temporary path for said load current in derivation with respect to a conductive one of said main controllable rectifiers, said predetermined voltage being larger than the line to neutral voltage applied to said conductive main controllable rectifier thereby to turn it OFF after said temporary path has been established at the magnitude of said load current, said series combination being connected in parallel with said main controllable rectifiers and in series with said load and said alternating current source.

3,989,997

ABSOLUTE-VALUE CIRCUIT

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed July 3, 1975, Ser. No. 593,115
Int. Cl.² H02M 7/21
U.S. Cl. 321—47 **16 Claims**



1. A circuit for translating an alternating input signal current to a load current comprising, in combination:

first and second complementary current mirror amplifiers, each having an input current path and first and second output current paths through each of which flows a cur-

rent proportionally related to its respective input current, said first current mirror amplifier connected to its output current paths to the corresponding paths of said second current mirror amplifier;

means for applying a quiescent current to the input current paths of each of said current mirror amplifiers;

means for applying said input signal current to said input current path of said second current mirror amplifier for thereby conditioning both output paths of said second current mirror amplifier to accept an amount of current proportional to the total current flowing through the input current path of said second current mirror amplifier;

a third current path connected in shunt with said second current path of said second current mirror amplifier;

means coupled to the first output current path of said second current mirror amplifier and to said third current path, responsive to the conditioning of said first output current path of the second current mirror amplifier to accept more current than the first output current path of the first current mirror amplifier can provide for cutting off said third current path, and responsive to the conditioning of the first output current path of the second current mirror amplifier to accept less current than the first output current path of the first current mirror provides for closing the third current path; and

a load circuit connected to the second current path of the second current mirror amplifier and to said third current path for supplying a flow of current to the one of these paths demanding more current than the second current path of the first current mirror amplifier can provide.

3,989,998

WIDE RANGE PULSE GENERATOR

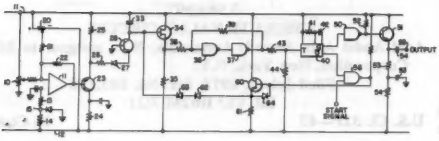
Anthony G. Chaprnka, Cockeysville, and Patrick J. McKenzie, Baltimore, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1974, Ser. No. 495,759

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² H02M *5/00*

U.S. Cl. 321—61 **10 Claims**



1. A pulse generator comprising:

an exponential voltage to current converter means adapted to respond to a DC input voltage level by producing an output current which is an exponential function of said DC input voltage level;

a first circuit means operatively connected to said exponential voltage to current converter means and responding to said output current by changing the charge state of a capacitor in a first direction;

second circuit means operatively connected to said first circuit means for generating an output pulse in response to a predetermined level of charge of said capacitor, and

third circuit means for changing the charge state of said capacitor in a second direction in response to said pulse.

3,989,999

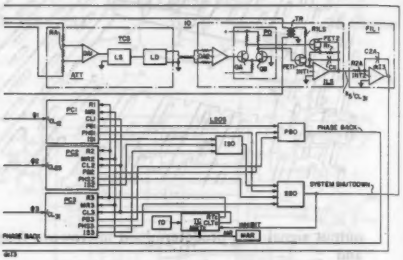
LOAD SAVING OVER CURRENT APPARATUS FOR SHUTDOWN IN A REACTIVE POWER GENERATOR

Francis T. Thompson, Murrysville, and Michael B. Brennen, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 23, 1974, Ser. No. 535,626

Int. Cl.² H02J *3/18*

U.S. Cl. 323—9 **6 Claims**



1. A reactive power generator comprising:

sensing means for sensing the value of electrical power carried by an electrical conductor from a source of power to a reactive load;

switchable means for supplying a component of reactive power for a first period of time during each power cycle to said electrical conductor to compensate for the reactive power utilized in said load to thus draw net power of generally unity power factor from said source;

control means for converting said value of sensed power to a time related switching function signal, said time related switching function signal being applied to said switchable means to cause said switchable means to supply said component of reactive power during each power cycle to said conductor for said first period of time;

current sensing means for monitoring the level of electrical current flowing in said switchable means when supplying said component of reactive power; and

corrective means connected to said current sensing means for providing an inhibiting signal to said control means when the level of said current in said switchable means is greater than a first predetermined value to thereby inhibit the application of said time related switching function signal to said switchable means for a predetermined delay period to thereby limit the application of said component of said reactive power which is supplied to said conductor to a time which does not begin before the end of said delay period, said switchable means supplying said reactive power for a period of time which is no longer than said first period of time.

3,990,000

ALTERNATING CURRENT CONTROL SYSTEM

Henri Joseph Digneffe, Fexhe Slins, Belgium, assignor to RCA Corporation, New York, N.Y.

Filed July 10, 1975, Ser. No. 594,631

Int. Cl.² G05F *1/44*

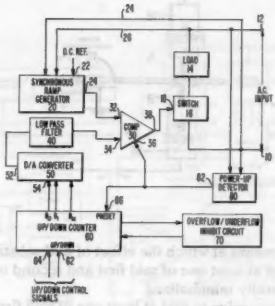
U.S. Cl. 323—24 **3 Claims**

1. In an alternating current control system of the kind comprising two power terminals for receiving a substantially sinusoidal alternating current signal thereacross, a thyristor and a load in series across said terminals, a comparator coupled to said thyristor for controlling the conduction angle thereof, means for applying a first control signal to a first input terminal of said comparator, a synchronous ramp generator coupled to a second input terminal of said comparator for supplying a second control signal thereto which changes, monotonically, from a first value to a second value and resets to the first value each half cycle of said alternating current signal, the

improvement for providing a substantially cosinusoidal incremental variation of said thyristor conduction angle in response to linear incremental variations in a digital control signal, characterized in that:

said synchronous ramp generator comprises full wave rectifier means having two input terminals for receiving said alternating current signal and two output terminals for producing a full wave rectified output signal, a series connection of a resistor and a capacitor coupled between said output terminals for producing a generally cosinusoidal ramp voltage at a point on said series connection, said point being coupled to said second input terminal of said comparator, and zero voltage detector means for discharging said capacitor at each axis crossing of said alternating current signal; and

said means for applying said first control signal to said comparator comprises a digital to analog converter having input means for receiving said digital control signal and output means coupled to said first terminal of said comparator.



3,990,001

MEASURING TRANSFORMER FOR INSTALLATION IN THE METAL ENCLOSURE OF A SWITCHING INSTALLATION

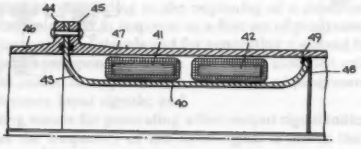
Heinz Schiemann, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 17, 1974, Ser. No. 471,015

Claims priority, application Germany, May 17, 1973, 2325441

Int. Cl.² H01F *27/00*; H01B *9/06*

U.S. Cl. 323—44 R **14 Claims**



1. A measuring transformer arrangement for installation and use in a switching installation equipped with a conductor and a metal enclosure having mutually adjacent flanged members surrounding the conductor, the measuring transformer arrangement comprising:

a rigid, elongated annular member extending in a direction parallel to the conductor and disposed within the switching installation in surrounding relation to the conductor, said annular member having an inner surface spaced from the conductor;

a transformer assembly carried by said annular member;

said annular member having a mounting shoulder extending from its outer surface into the interface between the flanges of the flanged members of the metal enclosure; and

clamping means for clamping said mounting shoulder between the flanges whereby said transformer assembly is held within the metal enclosure in spaced relationship to the conductor.

3,990,002

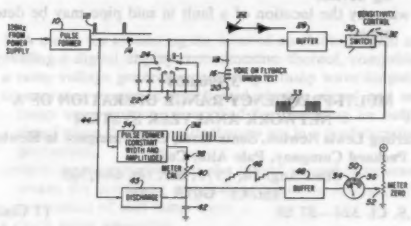
METHOD AND APPARATUS FOR TESTING TELEVISION YOKES AND FLYBACK WINDINGS

Robert E. Baum, Dell Rapids, S. Dak., assignor to Sencore, Inc., Sioux Falls, S. Dak.

Filed May 7, 1975, Ser. No. 575,196

Int. Cl.² G01R *31/02, 31/06*

U.S. Cl. 324—51 **6 Claims**



1. An instrument for testing television yokes and the windings of flyback transformers, comprising

a plurality of capacitors having different values of capacitance,

means for selectively connecting said capacitors in parallel with said coil,

a source of a train of voltage pulses,

means for connecting said source of voltage pulses to said yokes or windings to cause said yokes or windings to ring and produce dampened sine waves of voltage thereacross while each of said capacitors is respectively connected in parallel therewith,

means for counting the number of cycles occurring in each of said dampened sine waves between two predetermined voltage values thereof, and

means for indicating if the maximum number of cycles counted in said dampened sine waves exceeds a predetermined value with each value of capacitance connected across said yoke or winding.

3,990,003

PULSED LOOP ANTENNA-CONDUIT ELECTROMAGNETIC RADIATOR TEST TECHNIQUE FOR ELECTROMAGNETIC SHIELDING FLAW DETECTION IN BURIED CONDUITS AND SHIELDED CONDUCTORS

Forrest J. Agee, Jr., and Huey A. Roberts, both of Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 17, 1975, Ser. No. 614,712

Int. Cl.² G01R *31/08*

U.S. Cl. 324—52 **10 Claims**

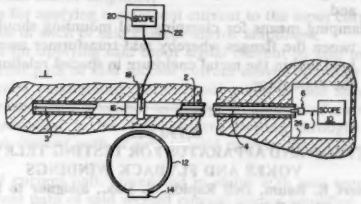
1. Apparatus for detecting flaws in a buried conductive pipe, comprising:

a sense wire longitudinally disposed within said pipe;

a current amplitude measuring device coupled to said sense wire;

a loop antenna external to said pipe, with the plane of said loop positioned substantially parallel to the axis of said pipe;

a voltage pulsing means connected to said antenna, for generating a pulse of electromagnetic radiation coupling said pipe;



said electromagnetic radiation coupling said sense wire through a flaw in said pipe, thereby inducing a current pulse in said sense wire which is detected by said measuring device;

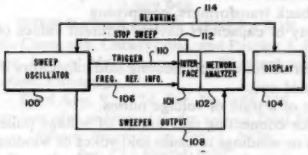
whereby the location of a fault in said pipe may be determined.

3,990,004

MULTI-FREQUENCY RANGE OPERATION OF A NETWORK ANALYZER SYSTEM

Sterling Lewis Newton, Santa Rosa, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 14, 1975, Ser. No. 604,700
Int. Cl.² G01R 27/00
U.S. Cl. 324—57 SS **11 Claims**



1. A system comprising:

a sweep oscillator for providing a first electrical signal progressing from a first frequency to a second frequency, for providing a second electrical signal which is related to the frequency of the first signal, and for receiving a third electrical signal and holding the first electrical signal at its present frequency in response thereto; and

a network analyzer having a phase-lock loop circuit coupled to the sweep oscillator for receiving the first and second electrical signals and for phase-locking on the first electrical signal in response to the second electrical signal, and having an interface circuit for providing the third electrical signal when the phase-lock loop circuit is not locked on the first electrical signal.

3,990,005

CAPACITIVE THICKNESS GAUGING FOR UNGROUNDED ELEMENTS

Robert C. Abbe, Newton, and Noel S. Poduje, Needham Heights, both of Mass., assignors to Ade Corporation, Watertown, Mass.

Filed Sept. 3, 1974, Ser. No. 502,874
Int. Cl.² G01R 27/26
U.S. Cl. 324—61 R **25 Claims**

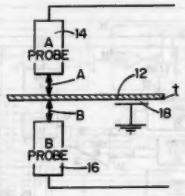
1. A capacitive gauging system comprising:

first probe means for applying excitation to a region of an element across a gap and for producing a first output signal representative of excitation applied to said element;

second probe means for applying excitation to said region of said element across a gap and for producing a second output signal representative of excitation applied to said element;

said element having a substantial impedance to said first and second probe means other than across said gaps;

means for providing a predetermined element potential in the region of applied excitation from said first and second



probe means at which the effect of said substantial impedance on at least one of said first and second output signals is generally minimalized.

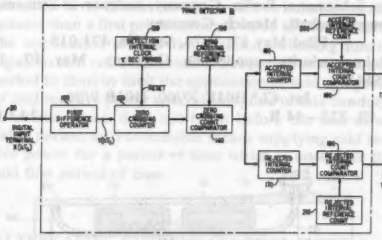
means responsive to said at least one of said first and second output signals for producing an output indication corresponding to proximity of said element to at least one of said first and second probe means under conditions of said predetermined element potential.

3,990,006

DIGITAL TONE DETECTOR USING CONCATENATED DETECTION INTERVALS

Timothy James Zebo, Freehold, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 8, 1975, Ser. No. 539,414
Int. Cl.² G01R 23/02
U.S. Cl. 324—78 D **13 Claims**



1. A tone detector comprising:

means for defining a sequence of substantially equal detection intervals,

means operable during each detection interval for detecting an input signal of predetermined frequency, and

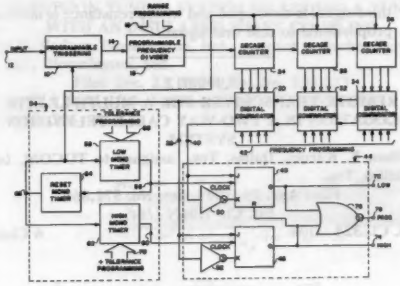
means for providing an output indication in response to the detection of said predetermined frequency signal during each of at least a predetermined plurality of said detection intervals within said sequence, said predetermined plurality being less than the number of detection intervals in said sequence.

3,990,007

PROGRAMMABLE FREQUENCY DETECTOR

Kenneth J. Hohhof, Des Plaines, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Mar. 31, 1975, Ser. No. 563,925
Int. Cl.² G01R 23/02
U.S. Cl. 324—78 Q 5 Claims



1. A frequency detector circuit for determining if the frequency of an input signal is above, below, or within a programmable tolerance of a programming frequency, comprising:

digital counter means for counting the number of periods of the input signal during a predetermined calculation period and for providing encoded signals corresponding to the number of periods of the input signal counted during the predetermined calculation period;

digital comparator means for comparing the encoded signals with a first set of encoded input signals corresponding to a number of periods of the programmed frequency during the predetermined calculation period and generating a first indication signal when the number of periods of the linput signal is less than the number of periods of the programmed frequency and generating a second indication signal when the number of periods of the input signal is greater than the number of periods of the programmed frequency;

programmable timing means for generating a first timing signal corresponding to the beginning of a modified calculation period in response to a first set of programmable tolerance input signals and for generating a second timing signal corresponding to the end of the modified calculation period in response to a second set of programmable tolerance input signals; and

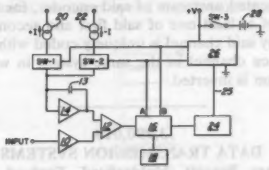
latching means for generating a first output signal indicating that the frequency of the input signal is above the programmable tolerance in response to the occurrence of the second indication signal after the first indication signal and before the first timing signal, a second output signal indicating that the frequency of the input signal is within the programmable tolerance in response to the occurrence of the second indication signal after the first indication signal and during the modified calculation period, and a third output signal indicating that the frequency of the input signal is below the programmable tolerance in response to the occurrence of the second indication signal after the first indication signal and after the second timing signal.

3,990,008

DISPLAY CIRCUIT FOR BATTERY POWERED DIGITAL METER

Marlin D. Westra, Sioux Falls, S. Dak., assignor to Sencore, Inc., Sioux Falls, S. Dak.

Filed Mar. 12, 1975, Ser. No. 557,893
Int. Cl.² G01R 19/26; H03K 13/20
U.S. Cl. 324—120 3 Claims



1. A meter for measuring the level of an electric signal and providing a digital display representative thereof, comprising

a ramp voltage generator providing a ramp wave output,

comparator means to which said electric signal and said ramp wave output are applied for providing an output signal when the two inputs thereto are in a predetermined proportion,

control means responsive to the output of said comparator means for providing a switching signal to interrupt the generation of said ramp wave,

a clock pulse generator,

a pulse counter to which the pulses from said generator are applied,

said counter resetting after every predetermined number of counts and initiating a metering cycle,

a digital display device for providing a visual readout of said level,

means responsive to said level at said input for coupling the count in said pulse counter to said display device when the number of pulses counted is representative of said level, and

automatic control means responsive to said level for energizing said display device only when the amplitude of said signal is above a predetermined level,

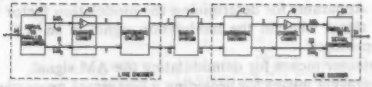
said automatic control means also being responsive to said switching signal and including time delay means for sensing the presence of said switching signal at a predetermined time after initiation of each metering cycle.

3,990,009

METHOD AND APPARATUS FOR UNIQUELY ENCODING CHANNELS IN A DIGITAL TRANSMISSION SYSTEM

George Howard Lentz, Andover, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 14, 1975, Ser. No. 558,220
Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976
Int. Cl.² H03K 13/32
U.S. Cl. 325—40 7 Claims



1. In a multichannel digital transmission system of the type wherein: (a) the incoming digital bitstream associated with each channel is divided into frames, each of said frames including a first group of terminal control bits, a group of data bits, and a second group of terminal control bits; (b) *n* such frames define a superframe; and (c) the receiving location

includes monitoring means, responsive to said terminal control bits, for marking a channel bad if said terminal control bits indicate an excessive number of parity violations; a line encoder which comprises:

a series-to-parallel converter connected to the source of the incoming bitstream for generating, on two parallel bit rails, first and second bitstreams at half the rate of the incoming bitstream;

an encoder connected to said parallel bit rails for encoding said first and second bitstreams for transmission over said digital transmission system; and

means, located upstream of said encoder, for inverting the sense of at least one of said first and second bitstreams whereby said channel is uniquely coded with respect to a reference channel in the same system in which neither bitstream is inverted.

3,990,010

DATA TRANSMISSION SYSTEMS

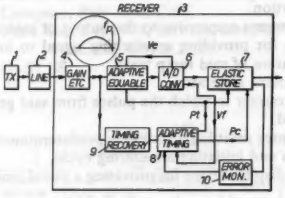
Jeffrey Henry Bennett, Maidenhead, England, assignor to Plessey Handel und Investments A.G., Zug, Switzerland

Filed Oct. 3, 1974, Ser. No. 511,651

Claims priority, application United Kingdom, Oct. 5, 1973, 46733/73

Int. Cl.² H03H 7/36

U.S. Cl. 325—42 **12 Claims**



1. A receiver for use in a data transmission system, the receiver comprising adaptive equalizer means, means for applying a received signal to the adaptive equalizer means, a reference frequency source, timing means, including the reference frequency source, for causing the adaptive equalizer means to be sampled for distortion equalization purposes, distortion monitoring means operable on the received signal for affording an output indicative of the distortion of the received signal and adaptive timing means operable in association with timing means for causing the sampling of the adaptive equalizer means to be varied relative to the reference frequency source in dependence upon the output of said distortion monitoring means.

3,990,011

METHOD AND APPARATUS FOR DETERMINING AM MODULATION FACTOR

Jerry K. Knight, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 10, 1975, Ser. No. 612,141

Int. Cl.² H04B 17/00

U.S. Cl. 325—133 **5 Claims**

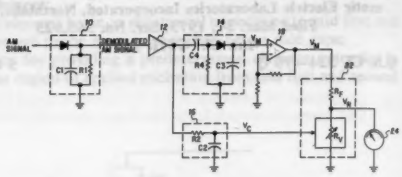
1. Apparatus for determining the modulation factor for an AM signal wherein the modulation signal is an A.C. wave, comprising:

detector means for demodulating the AM signal;

averaging means for providing a first signal proportional to the average D.C. level of the demodulated AM signal;

peak detector means for providing a second signal proportional to the peak deviation of the demodulated AM signal from its average D.C. level, and

division means for providing a third signal proportional to the ratio of said second signal to said first signal wherein said division means is a divider circuit for receiving said second signal that has a variable resistor across which said



third signal is developed and whose resistance is inversely proportional to said first signal.

3,990,012

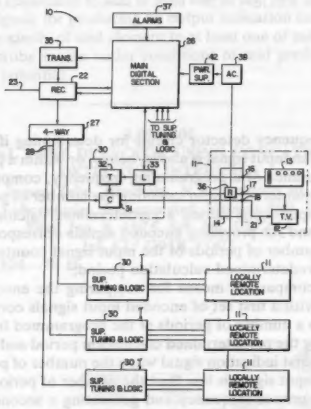
REMOTE TRANSCEIVER FOR A MULTIPLE SITE LOCATION IN A TWO-WAY CABLE TELEVISION SYSTEM

William F. Karnes, Dallas, Tex., assignor to TOCOM, Inc., Dallas, Tex.

Filed Apr. 25, 1975, Ser. No. 571,869

Int. Cl.² H04N 1/44

U.S. Cl. 325—308 **6 Claims**



1. An improved remote transceiver for a two-way cable television communications system of the type including receiving means coupling the remote transceiver to a cable network for two-way communications between the remote transceiver and a central transmitting station, a logic controller for decoding downstream signals, including television program, interrogation and command signals and transmitting means coupled to said logic controller for transmitting signals upstream to said central station, through said receiving means wherein the improvement comprises:

a plurality of supplemental controllers, each comprising:

a logic section coupled to said logic controller;

a television program signal converter means; and

tuning means controlled by said logic section for controlling said converter means;

a plurality of locally remote control stations, each comprising:

an RF terminal, for connection to a signal input of a commercial television receiver, coupled to a converter means in a corresponding supplemental controller;

selective control means coupled to a logic section in a corresponding supplemental controller;

means for connecting to the power terminals of the television receiver;

switching means for connecting said power terminal connecting means to a source of electrical power; and

means coupling said switching means to a logic section in a corresponding supplemental controller;

directional coupling means having an input coupled to said receiving means and a plurality of outputs, each coupled to a converter in a corresponding supplemental controller, for coupling downstream television program signals to all of said converter means.

3,990,013

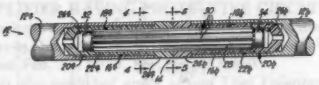
TELEVISION TUNING SYSTEM INCLUDING A TUNER WITH AN INSULATED SHAFT COUPLING

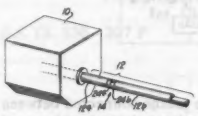
Joe G. Badger, Bloomington, Ind., assignor to Sarkes Tarzian, Inc., Bloomington, Ind.

Filed Dec. 23, 1974, Ser. No. 535,223

Int. Cl.² H03J *1/00*; F16C *3/00*; G05G *25/00*; B25G *1/12*

U.S. Cl. 325—464 **13 Claims**





1. A television tuning system of the type employing an insulated shaft coupling comprising:

a television tuner;

first and second rigid shaft sections, each having an axially extending chamber formed in one end thereof, said first shaft section extending into said tuner;

an elongated rigid pin member; and

means for electrically insulating said first and second shaft sections from each other surrounding at least a portion of said pin member, said insulating means being interposed between said pin member and each of said first and second shaft sections and electrically insulating said pin member from each of said shaft sections, said insulating means also having a surface frictionally engaging said first and second shaft sections and rigidly mechanically coupling said first and second shaft sections together to permit said tuner to be tuned by rotating said second shaft section, said insulating means serving to transmit rotational motion from said second shaft section to said first shaft section.

3,990,014

PULSE CONTROL CIRCUIT HAVING MANUALLY VARIABLE OUTPUT PERIOD BETWEEN PULSES

Hiroshi Hakozaki, Fujisawa, Japan, assignor to Mitsui Shipbuilding and Engineering Co., Ltd., Tokyo, Japan

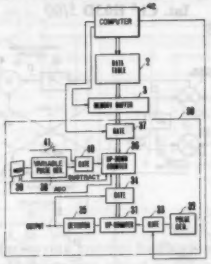
Continuation-in-part of Ser. No. 445,829, Feb. 26, 1974, abandoned. This application Oct. 20, 1975, Ser. No. 624,237

Claims priority, application Japan, Feb. 26, 1973, 48-22778

Int. Cl.² G05B *19/40*; H03K *21/36*

U.S. Cl. 328—42 **9 Claims**

1. A pulse control circuit for producing pulses having a variable output period comprising an up-counter having first and second inputs and an output, a first pulse generator for generating a pulse train having pulses of a predetermined period, said first pulse generator being connected to serially supply input pulses having a fixed repetition rate to the first input of said up-counter for causing said up-counter to count up to a preset count stored in the up-counter, a detector connected to the output of said up-counter for producing an output signal pulse in response to the serially supplied input pulses accumulating to the preset count stored in the up-counter and the up-counter producing an overflow signal, a gate circuit responsive to the output of said detector and connected to the second input of said up-counter for reading into said up-counter an input speed data count that presets the



count stored in said up-counter after each output pulse produced by the detector, an up-down counter having first and second inputs and an output, the output of said up-down counter being connected to supply the input speed data count to the second input of said up-counter through said gate circuit, means for supplying an input data count to the first input of said up-down counter for storing therein said data count, an operator controlled second pulse generator connected to the second input of said up-down counter for serially supplying pulses thereto for changing the count stored in said up-down counter, and means for deriving output signal pulses having an adjustable repetition rate from the output of said detector.

3,990,015

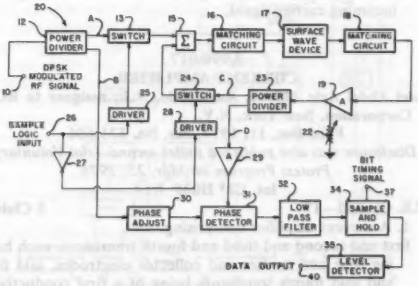
DIFFERENTIAL PHASE SHIFT KEYED DETECTOR UTILIZING A CIRCULATING MEMORY

Robert S. Gordy, Largo; Ramon P. Chambers, Clearwater; David E. Sanders, and Cameron E. Morrison, both of Saint Petersburg, all of Fla., assignors to NCR Corporation, Dayton, Ohio

Filed July 24, 1975, Ser. No. 598,893

Int. Cl.² H03D *3/02*

U.S. Cl. 329—105 **12 Claims**



1. A detector for detecting a received binary bit coded differentially phase shift keyed signal comprising:

sampling means for sampling the received differentially phase shift keyed signal at a binary bit rate to provide a bit sample signal;

circulating delay means for receiving and delaying said bit sample signal for one bit period;

comparing means for comparing said received signal with the delayed bit sample signal to provide a signal indicative of the phase difference between the compared signals.

3,990,016

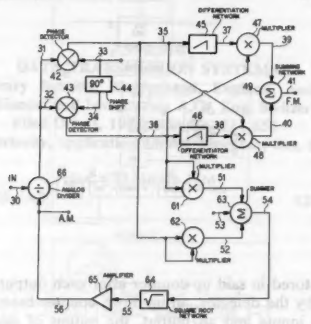
ASYNCHRONOUS DEMODULATOR

Donald Dimon, Box 519, Arlington Heights, Ill. 60006

Filed Apr. 23, 1975, Ser. No. 570,634

Int. Cl.² H03D *5/00*

U.S. Cl. 329—135 **3 Claims**



1. A system for simultaneously demodulating an incoming carrier signal to remove amplitude and frequency modulated signals therefrom comprising:

a frequency demodulator comprising a pair of phase detectors receiving said incoming carrier signal, a reference signal source connected to one of said pair of phase detectors, a ninety degree phase shifter connected between said other phase detector and said reference signal source,

a frequency discriminator connected to the outputs of said first and second phase detectors and producing the frequency modulated signal,

a pair of multipliers respectively receiving the outputs of said pair of phase detectors,

a reference amplitude signal source,

a summing device receiving the outputs of said pair of multipliers and said reference amplitude signal source output, said amplitude modulated signal obtained from the output of said summing device, including an analog divider connected between said input to said pair of phase detectors and said summing device and also receiving said incoming carrier signal.

3,990,017

CURRENT AMPLIFIER

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 11, 1974, Ser. No. 531,686

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H03F *3/18*

U.S. Cl. 330—17 **5 Claims**

1. A current amplifier comprising:

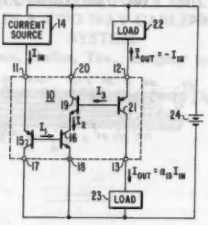
first and second and third and fourth transistors, each having base and emitter and collector electrodes, said first and said fourth transistors being of a first conductivity type and having matched common-emitter forward current gain characteristics, said second and said third transistors being of a second conductivity type and having matched common-emitter forward-current gain characteristics, said first and said second conductivity types being complementary to each other, said first transistor base electrode being connected to said second transistor base electrode, said third transistor base electrode being connected to said fourth transistor base electrode;

supply means, with first and second terminals, for supplying an operating potential between its said first and said second terminals;

first direct current conductive means connected between said first transistor collector electrode and said first terminal of said supply means;

second direct current conductive means connected between said second transistor emitter electrode and said first terminal of said supply means;

third direct current conductive means connected between said second transistor collector electrode and said third transistor emitter electrode;



fourth direct current conductive means connected between said third transistor collector electrode and said second terminal of said supply means;

means exclusive of said fourth transistor connected to said first transistor emitter electrode for causing an input current flow therethrough;

a first path for direct current, connecting said fourth transistor collector electrode and said first terminal of said supply means;

a second path for direct current, connecting said fourth transistor emitter electrode and said second terminal of said supply means; and

first load means for receiving an output current responsive to said input current, said first load means being included in one of said first and said second paths for direct current.

3,990,018

TRANSISTOR DIFFERENTIAL AMPLIFIER CIRCUIT

Yoshiyuki Nakagomi, Kodaira, Japan, assignor to Hitachi, Ltd., Japan

Filed Sept. 10, 1975, Ser. No. 611,892

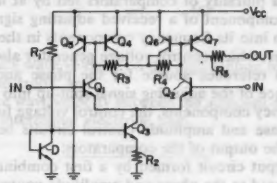
Claims priority, application Japan, Sept. 13, 1974, 49-105023

Int. Cl.² H03F *3/45*

U.S. Cl. 330—30 D **7 Claims**

1. A transistor differential amplifier circuit comprising a first transistor and a second transistor which are of a first conductivity type, a third transistor and a fourth transistor each of which is of a second conductivity type lateral structure including at least a first collector and a second collector, common impedance means, a first power supply terminal, a second power supply terminal, and output means, respective emitters of said first and second transistors being differentially connected and being connected through said common impedance means to said second power supply terminal, collectors of said first and second transistors being respectively connected to the first collectors of said third and fourth transistors, emitters of said third and fourth transistors being respectively connected to said first power supply terminal, said

second collector of said third transistor being connected to said second power supply terminal, said second collector of said fourth transistor being connected to said output means,



said output means providing therefrom an output signal which is a difference component between two input signals applied to bases of said first and second transistors.

3,990,019

POWER AMPLIFIER HAVING PROTECTIVE CIRCUITS

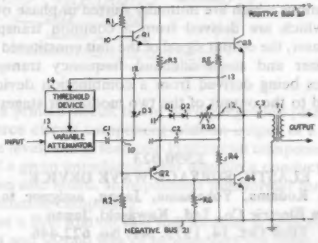
William B. Crockett, and Otward Mueller, both of Lynchburg, Va., assignors to General Electric Company, Lynchburg, Va.

Filed Feb. 27, 1975, Ser. No. 553,460

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² H03F *3/18*

U.S. Cl. 330—207 P **9 Claims**



1. In a transistorized power amplifier comprising:

a. an input for said amplifier;

b. a pair of complementary input transistors connected to said input to supply oppositely phased signals in response to an input signal applied to said amplifier input;

c. a pair of output transistors having input circuits respectively connected to said complementary input transistors, said output transistors being responsive respectively to said oppositely phased signals to provide output signals for said amplifier;

d. normally conductive switching means connected between one of said output transistors and one of said complementary input transistors;

e. normally nonconductive switching means connected between said one output transistor and said amplifier input;

f. said normally conductive switching means becoming nonconductive in response to an overload or an overdrive applied to said amplifier, and said normally nonconductive switching means becoming conductive in response to said normally conductive switching means becoming nonconductive; an improved restoral circuit comprising:

g. a threshold device having an input connected to said one output transistor and having an output that produces a threshold signal in response to a predetermined voltage at its input;

h. and an attenuator connected to said amplifier input, said attenuator having a control input connected to said threshold output for reducing the magnitude of input signals applied to said amplifier input in response to said threshold signal.

3,990,020

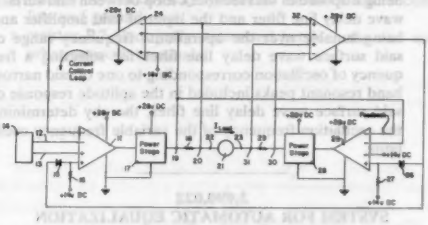
DC LINEAR POWER AMPLIFIER

Edwin C. Porter, III, Culver City, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed June 26, 1975, Ser. No. 590,666

Int. Cl.² H03F *21/00*

U.S. Cl. 330—207 P **6 Claims**



1. An amplifier having current foldback protection, whenever the current flowing into a load is different from the current flowing out of said load comprising:

means for providing power to a load;

first current sensing means coupling said power means to said load for sensing current flowing to said load and for providing a first sensing signal in response to said current;

second current sensing means coupling said power means to said load for sensing current flowing from said load and for providing a second sensing signal in response to said current;

comparator means responsive to said first and second current sensing signals and providing a first signal whenever said first and second current sensing signals are equal and providing a second signal when said first and second current sensing signals are different, said second signal effectively reducing the current in said load to zero.

3,990,021

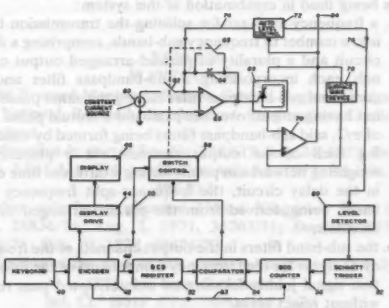
SURFACE WAVE MULTIFREQUENCY OSCILLATOR

Clinton S. Hartmann; Steven J. Bomba, both of Dallas, and Ralph F. Tenny, Richardson, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 2, 1973, Ser. No. 347,106

Int. Cl.² H03B *5/32*

U.S. Cl. 331—177 V **9 Claims**



1. A variable frequency oscillator comprising:

a broadband amplifier operatively responsive to a source for producing an electrical output,

a regenerative feedback loop electrically coupling the output of said amplifier to the input thereof,

an acoustic surface wave delay line multi-resonant filter disposed in said feedback loop and having an amplitude response over an operational frequency range containing a plurality of discrete narrow band resonant peaks respectively separated by substantial frequency bands where significant signal attenuation occurs, and

tuning means having a relatively broad passband as compared to a single narrow band resonant peak of said acoustic surface wave delay line filter, said tuning means being disposed in said feedback loop between said surface wave delay line filter and the input of said amplifier and being tunable over the operational frequency range of said surface wave delay line filter for selecting a frequency of oscillation corresponding to one of said narrow band resonant peaks included in the aplitude response of said surface wave delay line filter, thereby determining the oscillation frequency of the variable frequency oscillator.

3,990,022
SYSTEM FOR AUTOMATIC EQUALIZATION

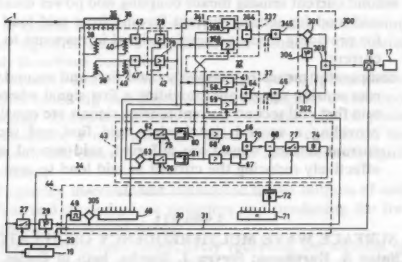
Petrus Josephus Van Gerwen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,387

Claims priority, application Netherlands, Dec. 2, 1974, 7415664

Int. Cl.² H04B *3/04*

U.S. Cl. 333—18 **8 Claims**



1. A system for equalization of the transmission characteristic formed by the amplitude-versus-frequency characteristic and the phase-versus-frequency characteristic of the transmission band associated with a transmission path and allotted to the transmission of information signals, the following measures being used in combination in this system:

a. a frequency-analyzer for splitting the transmission band into a number of frequency sub-bands, comprising a delay circuit and a plurality of parallel-arranged output channels each incorporating a sub-bandpass filter and an additional sub-bandpass filter having the same passbands but having at least over the passband a mutual phase shift of $\pi/2$, said sub-bandpass filters being formed by connecting each of the output channels via a plurality of weighting networks to points having a different time delay in the delay circuit, the frequency-split frequency subbands being derived from the parallel-arranged output channels;

b. the sub-band filters in the output channels of the frequency-analyzer for the frequency components of the information signal jointly forming an uninterrupted pass region without reject areas;

c. different output channels of the frequency-analyzer incorporating a phase and amplitude control circuit which are controlled by a control voltage;

d. a control voltage generator for generating the control voltages for controlling the phase and amplitude control circuits incorporated in the output channels of the frequency-analyzer, which control voltage generator comprises a plurality of comparators fed by at least a spectrum component of a received adjusting signal which is split-up into its frequency components in the frequency-analyzer, which control voltage generator also comprises a local reference source for the phase and amplitude reference of the adjusting signal split-up into its different frequency components, the control voltage for the different phase and amplitude control circuits being derived from the output of the comparators;

e. an output circuit formed by a first combination device connected to the phase and amplitude control circuits in the output channels of the frequency-analyzer, characterized in that an equalizer jointly with a single-sideband frequency transposition device constituting a unit, is provided with a second series of output channels connected to the various sub-bandpass filters and additional sub-bandpass filters, said second series of output channels having an output formed by a second combination device, different output channels of said second series incorporating a phase and amplitude control circuit which is cross-wise connected to the comparators of the control voltage generator to obtain an output signal from the second combination device which is shifted in phase over $\pi/2$ with respect to the output signal of the first combination device, these combination devices supplying a first and a second input signal for said single-sideband frequency transposition device having a first and second modulator stage, which are also fed by transposition oscillations which are mutually shifted in phase over $\pi/2$ and which are derived from a common transposition generator, the output signal of the unit constituted by said equalizer and single-sideband frequency transposition devices being derived from a combination device connected to the output of the two modulator stages.

3,990,023
ELASTIC SURFACE WAVE DEVICE

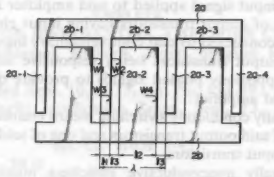
Toshikazu Kodama, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Oct. 14, 1975, Ser. No. 622,446

Claims priority, application Japan, Oct. 15, 1974, 49-117718

Int. Cl.² H03H *9/26*, *9/30*, *9/04*, *9/32*

U.S. Cl. 333—30 R **5 Claims**



1. An elastic surface wave device comprising a piezoelectric substrate and at least one pair of first and second adjacent interdigital electrodes provided on the surface of the piezoelectric substrate, in which when a width of one digit section in said first interdigital electrode is represented by $l1$ and a width of one digit section in said second interdigital electrode adjacent the one digit section in said first interdigital electrode is by $l2$ and when a clearance between both the digit sections of said interdigital electrode pair is represented by $l3$ and the central frequency of the fundamental of a surface wave is by $f0$, the following relation is established:

$$\frac{l1}{vm} + \frac{l3}{vf} = \frac{1}{4f0}$$

$$\frac{l3}{vf} + \frac{l2}{vm} = \frac{3}{4f0}$$

where

vm: surface wave velocity on the digit section of the interdigital electrode; and

vf: surface wave velocity between the adjacent digit sections of the interdigital electrode pair.

3,990,024

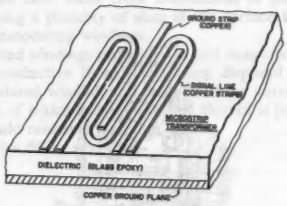
MICROSTRIP/STRIPLINE IMPEDANCE TRANSFORMER

Hsieh Sheng Hou, Rancho Palos Verdes, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 6, 1975, Ser. No. 538,643

Int. Cl.² H01P *5/00*

U.S. Cl. 333—33 **16 Claims**



4. In a printed circuit board having a ground plane, at least one source circuit component with an output of a given impedance level, and at least one load circuit component with an input of a given impedance level wherein a conducting line is etched on said board, an impedance transformer for step-wise transformation comprising:

at least a first fold on said line forming in said line at least first and second legs of substantially the same width and substantially the same distance from said ground plane, said second leg being folded back along said first leg in a parallel direction, the mutual coupling of said first and second legs causing a step-up or step-down impedance transition in said line depending upon the impedance levels of the circuit components connected to the respective ends of said line, and

a second grounded etched conducting line on said printed circuit board intermediate and electrically insulated from said first and second legs of said line, and extending along substantially the entire length of said legs to produce a smoother impedance transition in said impedance transformer.

3,990,025

NETWORK WITH A SINGLE AMPLIFIER FOR SIMULATING AN FDNR CIRCUIT

Man Shek Lee, Belmont, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 24, 1975, Ser. No. 644,280

Int. Cl.² H03H *7/44*

U.S. Cl. 333—80 R **10 Claims**

1. An active, one-port network for simulating the parallel combination of an FDNR D, a capacitor C, and a resistor R = 1/*G* electrically connected across the pair of terminals of the network port, comprising:

a differential-input operational amplifier having first and second input lines electrically connected to associated input terminals of the amplifier which are of opposite polarity and having an output line;

a resistor R1 electrically connected between one network terminal and said first input line;

a capacitor C2 electrically connected between the one terminal and said second input line;

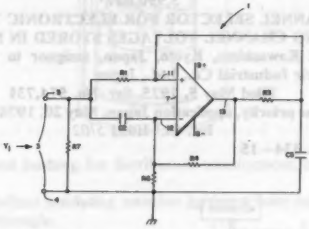
a resistor R3 electrically connected between said output line and said first input line;

a resistor R4 electrically connected between said output line and said second input line;

a capacitor C5 electrically connected between said first input line and the other network terminal which is also connected to a ground reference potential;

a resistor R6 electrically connected between said second line and ground; and

a resistor R7 electrically connected between the one and other network terminals;



normalized values of the capacitance of said capacitors and the resistance of said resistors and said simulated elements satisfying the requirements that

$$g4/g3 = C2/C5 \neq 0,$$

where g represents the conductance of a particular one of said resistors, the admittance Y_t looking into the network port satisfies the relationships

$$Y_t = s^2D + sC + G,$$

$$D = \gamma C2^2/g1,$$

$$C = \gamma(1 - \beta)C2,$$

$$G = g7 - \gamma\beta g1$$

and where $\alpha = C2/C5$, $\beta = g6/g1$, and $\gamma = 1/(\alpha - \beta)$.

3,990,026

WAVEGUIDES

Harold Everard Monteagle Barlow, Epsom, England, assignor to National Research Development Corporation, London, England

Continuation-in-part of Ser. No. 274,619, July 24, 1972, Pat. No. 3,845,426. This application Aug. 12, 1974, Ser. No. 496,813

Claims priority, application United Kingdom, June 28, 1974, 28836/74; Aug. 2, 1971, 36203/71; Dec. 20, 1971, 58951/71; Oct. 17, 1973, 48474/73

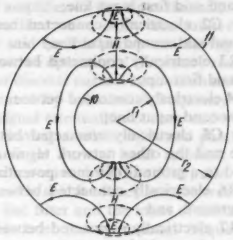
The portion of the term of this patent subsequent to Oct. 29, 1991, has been disclaimed.

Int. Cl.² H01P *3/12, 7/06, 1/16, 3/20*

U.S. Cl. 333—98 R **35 Claims**

1. Apparatus for supporting electromagnetic waves, including a hollow, elongated dielectric filled member having an

inner surface with transverse and longitudinal impedances suitable for the propagation of electromagnetic waves in the



dipole mode along the interface between the dielectric and the said inner surface and substantially within the hollow member.

3,990,027

CHANNEL SELECTOR FOR ELECTRONIC TUNER HAVING CHANNEL VOLTAGES STORED IN MEMORY

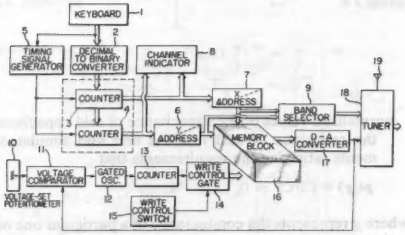
Kazumi Kawashima, Kyoto, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Japan

Filed May 5, 1975, Ser. No. 574,731

Claims priority, application Japan, May 20, 1974, 49-57106

Int. Cl.² H03J *5/02*

U.S. Cl. 334—15 **5 Claims**



1. A channel selector comprising

a. an electronic tuner in which a voltage-variable reactance element is used as a tuning element;

b. a memory block wherein channel selection voltages to be applied to said voltage-reactance element of said tuner are stored as digital signals, each of said voltages being of a value to tune said tuner to a desired channel;

c. means for reading out one of said digitized channel-selection voltages from said memory block; and

d. digital-to-analog converter means for converting the digitized channel-selection voltage read out from said memory block into the analog channel-selection voltage signal to be applied to said voltage-variable reactance element in said electronic tuner.

3,990,028

MULTIPLE CIRCUIT THERMAL CIRCUIT BREAKERS

Ronald Aust; Gerald Claude Littlehales, both of Coventry; Michael Arthur Bocock, Hinckley, and Dennis Izard, Coventry, all of England, assignors to Lucas Industries Limited, Birmingham, England

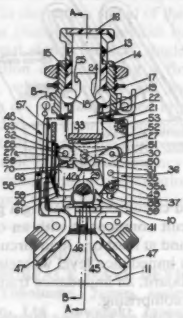
Filed May 27, 1975, Ser. No. 580,725

Claims priority, application United Kingdom, Oct. 5, 1974, 43277/74

Int. Cl.² H01H *61/06*

U.S. Cl. 337—46 **25 Claims**

1. A multiple circuit thermal circuit breaker comprising a housing and a plurality of single circuit thermal circuit breakers contained in the housing, each of said single circuit thermal circuit breakers comprising a fixed contact set mounted within the respective housing, a movable contact set mounted within the respective housing, said movable contact set when in an operative position co-operating with said fixed contact set to permit the flow of electric current between a pair of terminals, temperature sensitive means including an element which is heated by the flow of electric current between said terminals, and which when the magnitude of the current flow exceeds a predetermined value deflects to allow the movable contact set to be moved to an inoperative position, manually operable means for causing movement of the movable contact set between the operative and inoperative positions, a first lever pivotally mounted at one end, first resilient means for applying a force to said first lever intermediate the ends thereof, the force exerted on said lever being at least in part dependent upon the position of said manually operable means, second and third levers, means defining a retaining edge, said third lever mounting said movable contact set and having one end shaped to engage and be retained by the retaining edge, the other end of said third lever being pivotally connected to

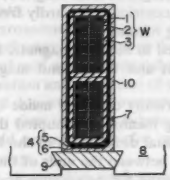


one end of said second lever, the other end of said second lever being operatively connected to the other end of said first lever, second resilient means acting on said third lever, the position of the means defining the retaining edge being dependent upon said temperature sensitive means the arrangement being such that when the force exerted by said first resilient means is above a predetermined value and the one end of said lever is retained by said edge, said movable contact set will be in the operative position and when said edge is moved by the temperature sensitive means, the third lever will under the action of said second resilient means, pivot relative to the second lever to move the movable contact set to an inoperative position, a single manually operable control carried by the housing, said manually operable control being coupled to the manually operable means of the single circuit contact breakers and a coupling link extending between a pair of adjacent single circuit contact breakers, said coupling link acting to cause in the event that one of said single circuit thermal circuit breakers operates due to excessive current flow, operation of the adjacent single circuit thermal circuit breaker whereby the circuits controlled by the multiple circuit thermal circuit breaker will be opened.

3,990,029
INSULATED WINDINGS PROVIDED WITH A MOULD RELEASING MATERIAL

Ikushi Kano; Takeshi Hakamada; Misao Soma, and Mituo Kashimura, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed May 23, 1975, Ser. No. 580,368
Claims priority, application Japan, May 29, 1974, 49-59735
Int. Cl.² H01F 3/00
U.S. Cl. 335—297 4 Claims

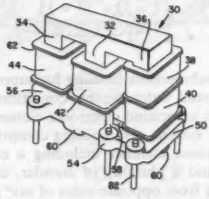


1. An electromagnetic apparatus comprising:
an iron core made from laminations of steel sheets and having a plurality of slots at the surface thereof for accommodating windings;
insulated windings embedded in said slots of said iron core;
semiconductive liners each being disposed between said insulated winding and the wall of the corresponding slot and of which at least one side thereof is provided with a mould releasing material; and
adhesive filling said slots.

3,990,030
PINCUSHION CORRECTION TRANSFORMER

Edward R. Chamberlin, Loveland, Ohio, assignor to Standex International Corporation, Andover, Mass.

Filed Aug. 11, 1975, Ser. No. 603,536
Int. Cl.² H01F 27/30
U.S. Cl. 336—65 10 Claims

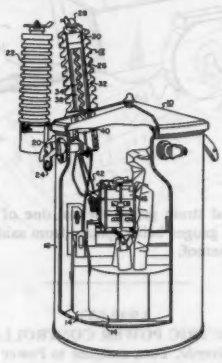


1. A pincushion correction transformer comprising:
an E core having a central leg and first and second outer legs, all of said legs being connected in magnetic circuit at their ends only by first and second core segments to define a two window magnetic core;
a first winding on said first leg;
a second winding on said first leg connected to said first winding in equal and opposite phase to provide a vertical correction winding;
first and second electrical terminals coupled to said interconnected first and second windings;
a third winding around said central leg and serving as a control winding for said transformer;
third and fourth electrical terminals coupled to said third winding;
a fourth winding around said second outer leg serving as a horizontal correction winding;
fifth and sixth electrical terminals connected to said fourth winding.

3,990,031
ELECTRICAL BUSHING CONTAINING A FULL-RANGE CURRENT-LIMITING FUSE

Ronald E. Benton, Athens, Ga., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 17, 1975, Ser. No. 569,036
Int. Cl.² H01H 85/02
U.S. Cl. 337—202 2 Claims



1. A fused bushing for distribution transformers, comprising:
a longitudinal insulating member having a bore extending therethrough;
an electrical terminal located at the top end of the insulating member;
a sealed, full-range current-limiting fuse positioned within said bore, said fuse having first and second ends with the first end electrically connected to said terminal;
a conductor stud partially located within said bore and having first and second ends with the first end of the stud attached to the second end of the fuse;
a retaining washer positioned across the bottom end of the insulating member, with the washer containing an opening through which the stud extends and openings which permit flow communication between the bore and the outside of the insulating member;
means for pulling the stud through the opening in the washer; and
a cylindrical sleeve constructed of an insulating material, said sleeve being positioned between the second end of the fuse and the inside surface of the insulating member.

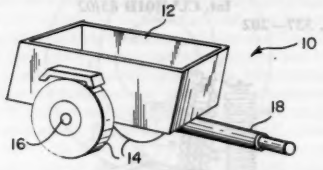
3,990,032
VEHICLE WEIGHING SYSTEM

David H. Fish, Fairmont, Minn.; Charles H. Knodel, Germantown, Tenn.; Harry J. Keen, Waterford, and Paul Barrett, Concord, both of Vt., assignors to Colt Industries Operating Corporation, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,447
Int. Cl.² G01L 1/22
U.S. Cl. 338—5 22 Claims

1. A load transducer assembly for a wheeled vehicle including a load support comprising elongate elastic cantilevered beam means adapted to receive a force from said load support in a direction substantially normal to the longitudinal axis of said beam means, said beam means having a hole extending therethrough in a direction normal to the central longitudinal axis of said beam means and normal to the direction of said force applied thereto, and strain gauge means including at least two electrical resistance strain gauges mounted on said beam means within said hole for sensing the magnitude of force applied to said beam means, said strain gauge means being angularly positioned relative to a vertical plane through

the central axis of said hole which is perpendicular to the longitudinal axis of said beam means to minimize the moment



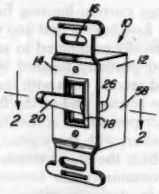
sensitivity of said strain gauge means, one of said electrical resistance strain gauges being spaced from said vertical plane on either side thereof.

3,990,033

ELECTRIC POWER CONTROLLER

Bill R. Wall, Bulverde, Tex., assignor to Power Controls, Corporation (Entire), San Antonio, Tex.

Filed May 20, 1975, Ser. No. 579,255
Int. Cl.² H01C 7/10
U.S. Cl. 338—200 16 Claims



1. In an electric circuit controller having a pair of spaced continuous tracks respectively made of conductive and resistive materials, an electrically conductive bridging contactor slidably engageable with said tracks and a pair of contact assemblies mounted adjacent opposite ends of the tracks in normally open and closed conditions respectively, the improvement including an enclosure having interconnected side walls forming an open end, a circuit board on which said tracks and contact assemblies are mounted, holder means fixed to the side walls for operatively positioning the circuit board within the enclosure, and a controller pivotally mounted in the enclosure having a non-conductive actuator arm positioned in parallel spaced relation to the circuit board and a control arm projecting from the open end of the enclosure, said actuator arm being engageable with the contact assemblies in opposite limit positions of the controller to respectively close the normally open contact assembly and open the normally closed contact assembly, means for carrying the bridging contactor on the actuator arm in sliding contact with the tracks and a mounting strap secured to the enclosure at the open end having means for retaining the controller in the enclosure and a slot through which the control arm extends.

3,990,034

TOWABLE VLF SONAR PROJECTOR

Frank R. Abbott, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 23, 1975, Ser. No. 570,674
Int. Cl.² G01V 1/00
U.S. Cl. 340—7 R 23 Claims

1. A transducer of acoustic energy in a water medium comprising:

means for inducing a first magnetic field;

means for inducing a second magnetic field disposed adjacent and concentrically inwardly from the first magnetic field inducing means;

means connected to the first magnetic field inducing means for housing it and the second magnetic field inducing means;

means concentrically disposed inside the second magnetic field inducing means and coupled thereto for extending beyond the axial dimensions of the housing means; and

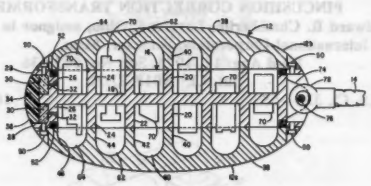
means coupled between the ends of the housing means and extending means for projecting acoustic energy as the extending means undergoes reciprocal excursions in response to electromagnetic interaction of the first and second magnetic field inducing means.

3,990,035

HOUSING CONFIGURATION FOR HIGH RESOLUTION SONAR

Jimmy F. Byers, Georgetown, Tex., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 5, 1975, Ser. No. 610,805
Int. Cl.² H04B 13/00
U.S. Cl. 340—8 R 11 Claims



1. A rigid, submersible housing for supporting and protecting, at substantial water depths, condition responsive instrumentation and associated electronic elements forming part of an instrument system, said housing comprising:

a central frame member including a circular planar wall portion and a plurality of annular, coaxial rib portions extending from opposite sides of said planar wall portion and normal thereto;

first and second cover members, each comprising a concavo-convex wall portion the convex side of which is directed outwardly away from said central frame member and the concave side of which is directed inwardly toward said central frame member, said first and second cover members each having a peripheral edge portion in engagement with a rim of the outermost of said annular rib portions of said central frame member;

said first and second cover members being further characterized by annular, coaxial rib portions, corresponding in diameter with rib portions of said central frame member and extending inwardly from said concave side of the respective cover member into engagement with corresponding ones of said rib portions of said central frame member, whereby said rib portions of said central frame member and of said first and second cover members cooperate to define a plurality of coaxial, annular electronic instrumentation compartments within said housing and also to provide compressive load bearing support

between said concavo-convex wall portions of said first and second cover members.

11. A high frequency, multiple beam sonar apparatus for towing underwater, said apparatus comprising in combination:

a watertight housing comprising a circular, central frame having a planar web from each side of which extend a plurality of radially spaced, annular ribs, first and second circular covers fixed to opposite sides of said central frame and each presenting an outer convex surface and inwardly extending, radially spaced annular ribs in enegagement with corresponding ribs of said central frame, whereby said housing defines a plurality of coaxial, annular compartments;

a plurality of electroacoustic transducer elements, disposed in predetermined array and fixed to the outer surfaces of the outermost of said annular coaxial ribs of said central frame, for projection and reception of acoustical energy;

plastic fairing and acoustic window means, disposed over said transducer elements and substantially around the periphery of said central frame, for providing streamlining of said housing;

electronic means, disposed in said annular compartments, for driving at least part of said transducer elements;

electronic means, disposed in said annular compartments, for effecting processing of electrical signals resulting from impringement of acoustic energy on at least part of said transducer elements; and

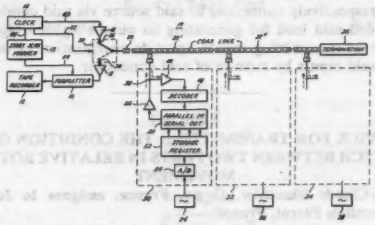
means, connected to said housing, for towing said apparatus through a water medium and for conducting electrical signals between said apparatus and a towing vehicle.

3,990,036

MULTIPLEXING METHOD AND APPARATUS FOR TELEMETRY OF SEISMIC DATA

Carl H. Savit, Houston, Tex., assignor to Western Geophysical Co., Houston, Tex.

Filed Feb. 28, 1974, Ser. No. 446,862
Int. Cl.² G01V 1/22
U.S. Cl. 340—15.5 TS **9 Claims**



2. A method of sampling the output data from a plurality of sensors wherein each sensor is positioned in a preassigned sequence, the sensors being substantially identical so that they can be interchangeable without affecting the sampling thereof;

transmitting a polling signal, all sensors being responsive to the same polling signal, which, because of the spatial arrangement of the sensors, reaches the sensors at predetermined intervals in accordance with the signal propagation velocity through a transmission channel due to their respective distances to the transmitter of the polling signal; and

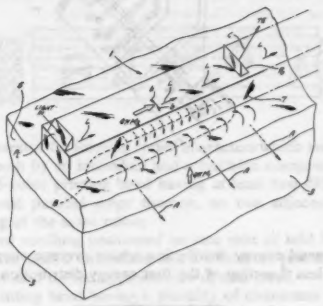
identifying as to the sensor of origin the data words transmitted by the respective sensors and received at a central recording station in accordance with the times elapsed from the transmission of the polling signal to the reception of the data words from the sensors at the central station.

3,990,037

PARALLEL ACCESS BUBBLE MEMORY

James Thomas Carlo, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 20, 1975, Ser. No. 560,411
Int. Cl.² G11C 11/14
U.S. Cl. 340—174 TF **18 Claims**



1. A parallel access magnetic bubble memory system comprising:

a planar thin film optical waveguide for the propagation of linearly polarized light along a first axis;

means for coupling light into said waveguide;

a plurality of detectors positioned along the axis of the waveguide; and

means for moving magnetic bubbles from memory storage locations along respective paths intersecting with said waveguide and transverse to the axis thereof with each of the paths corresponding to a respective detector, each of said detectors including means for coupling light out of said waveguide whereby the movement of magnetic bubbles along any of the respective paths so as to intersect with said waveguide will modulate the polarized light by the fringing fields of said bubbles so as to provide discrete light output signals from each of the detectors corresponding to the paths where magnetic bubble movement intersected with said waveguide, thereby indicating the presence of a bubble for each light output signal produced from the plurality of detectors.

3,990,038

ELECTRON BEAM SOURCE OF NARROW ENERGY DISTRIBUTION

Arthur S. Jensen, and Clarence Williams, both of Baltimore, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 7, 1973, Ser. No. 357,976
Int. Cl.² H01J 29/84, 29/58, 31/12, 31/28
U.S. Cl. 315—17 **10 Claims**

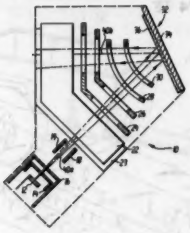
1. A source of electrons comprising:

a. means for generating from a cathode surface a first flow of electrons having a first energy distribution;

b. selector means comprising a substrate and a noble metal layer disposed thereon for receiving the first flow of electrons, and for absorbing electrons having energy levels above a predetermined level, which noble metal layer is formed as a low density layer having a density not greater than 20% of the noble metal in its bulk from; and

c. potential means for applying a selected potential to said selector means to establish a potential difference between said selector means and said cathode surface whereby

electrons of energy levels below the predetermined level are repelled to provide a second flow of electrons of a



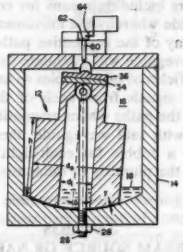
second energy distribution whose average energy spread is less than that of the first energy distribution.

3,990,039

TUNED GROUND MOTION DETECTOR UTILIZING PRINCIPLES OF MECHANICAL RESONANCE

Larry D. Miller, 145 N. El Camino Road, San Mateo, Calif. 94402

Filed Apr. 7, 1975, Ser. No. 565,925
Int. Cl.² G01V *1/16*
U.S. Cl. 340—17 R **10 Claims**



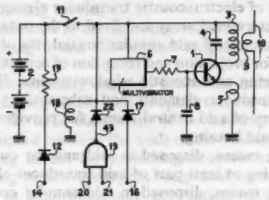
1. A tuned resonant ground motion sensor comprising:
a. housing means;
b. oscillatory mass means mounted in said housing for harmonic movement from a neutral position to a signaling position in response to applied vibrational forces falling within a predetermined frequency range; and
c. viscous damping means contained in said housing for impeding the natural harmonic motion of said mass means to broaden the range of frequencies to which said mass means responds, said viscous damping means comprising a viscous fluid in which said mass means is partially immersed, and wherein at least a portion of said mass means confronts a conforming surface of said housing across a narrow gap, said gap being completely occupied by said fluid.

3,990,040

APPARATUS FOR TRANSMITTING DISTRESS SIGNALS

Jean-Jacques Gleitz; Jean-Raymond Narbaits-Jaureguy, and Henri Billottet, all of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Oct. 21, 1974, Ser. No. 516,574
Claims priority, application France, Oct. 23, 1973, 73.37745
Int. Cl.² G08B *21/00*
U.S. Cl. 340—52 H **7 Claims**



1. A distress-signal generator carried aboard a moving object, comprising:
a deformation detector including an elongate rupturable conductor clad in a substantially rigid sheath of breakable insulating material, said conductor substantially conforming to the shape of the body of said object and contacting said body at a plurality of critical locations, and circuit means connected to said conductor for signaling any interruption thereof; and
transmitting means connected to said circuit means for emitting a distress signal upon an interruption of said conductor;
said circuit means including a lead protected against rupture and connected in parallel with said conductor to a source of operating voltage, and gate means with inputs respectively connected to said source via said conductor and said lead for generating an output signal triggering said transmitting means upon de-energization of one of said inputs by rupture of said conductor.

3,990,041

DEVICE FOR TRANSMITTING THE CONDITION OF A SWITCH BETWEEN TWO PARTS IN RELATIVE ROTARY MOVEMENT

Jean-Claude Blanchier, Orsay, France, assignor to Jaeger, Lavallois Perret, France

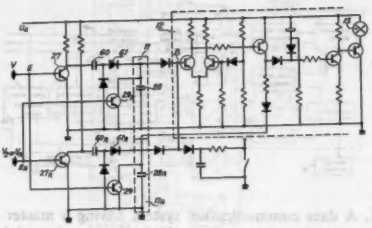
Filed Oct. 30, 1974, Ser. No. 519,271
Claims priority, application France, Nov. 7, 1973, 73.39588; June 28, 1974, 74.22741
Int. Cl.² B60C *23/02*
U.S. Cl. 340—58 **8 Claims**

1. A switch-condition transmitting device comprising:
a. a first assembly comprising a switch and at least two coils which are serially connected when said switch is closed;
b. a second assembly comprising a group of coils including a transmission coil and two serially connected detection coils, said coils of the second assembly being magnetically coupled to each other and being positioned so that in a first relative position of said assemblies a first coil of the first assembly is magnetically coupled to the transmission coil of the second assembly while a second coil of the first assembly is magnetically coupled to both of said detection coils;
c. exciting means for causing the transmission coil of the second assembly to generate an alternating magnetic field; and

d. detecting means coupled to the serially connected detection coils of the second assembly for producing different outputs respectively

1. when the detection coils of the second assembly are excited only from the field of the transmission coil of the second assembly and

2. when the detection coils of the second assembly are also excited from said second coil of the first assembly,



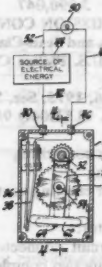
the windings of said detection coils being such that a zero resultant voltage is induced across the serially connected detection coils when said serially connected detection coils are magnetically coupled to the transmission coil only, and a non-zero resultant voltage is induced across said serially connected detection coils when said serially connected detection coils are further magnetically coupled to the coils of the first assembly.

3,990,042

INERTIA OPERATED SKID INDICATOR

Fred J. Styes, Mackinac County Medical Care Facility, St. Ignace, Mich. 49781

Filed Oct. 29, 1975, Ser. No. 626,666
Int. Cl.² B60T 8/02
U.S. Cl. 340—62 **6 Claims**



1. In a vehicle the combination comprising:

a body having a rotatable wheel member, and power means drivingly connected to the wheel member;

indicator means;

a flywheel connected to the wheel member so as to be rotatable therewith; and

a pendulum mounted in the vehicle so as to be movable with respect to the vehicle body, and so connected to the flywheel as to move from a first position toward a second position to actuate the indicator means in response to the wheel member being rotated with respect to the vehicle.

3,990,043

CHARACTER CODING AND RECOGNITION SYSTEM

Harold E. Clark, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 214,282, Dec. 30, 1971, Pat. No. 3,938,088. This application June 27, 1975, Ser. No. 591,241
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² G06K 7/12
U.S. Cl. 340—146.3 B **2 Claims**

1. Apparatus for forming coded characters which are recognizable both by an individual and a machine comprising:

a multi-color printing band having at least two differently colored parallel strips thereon, no two adjacent strips being of the same color;

a record medium positioned on one side of said band to receive coded characters and a character printing head positioned on the opposite side of said band;

said printing head having a plurality of characters formed thereon, said characters being of a size relative to said printing band to intersect more than one but less than all of the strips thereon when impacted against said band;

shift means for moving said band vertically with respect to said printing head in a predetermined manner to code different characters with different color combinations; and

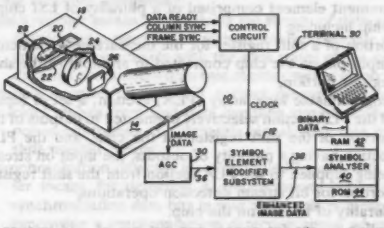
means for impacting said said band with said printing head to cause the formation of a color coded character on said record medium.

3,990,044

SYMBOL RECOGNITION ENHANCING APPARATUS

William David Fahey, Cupertino; Robert Wayne Lotz, Mountain View, and Jack Wendel Newhard, Cupertino, all of Calif., assignors to The Singer Company, Binghamton, N.Y.

Filed July 7, 1975, Ser. No. 593,349
Int. Cl.² G06K 9/12
U.S. Cl. 340—146.3 H **15 Claims**



1. A system for enhancing digital image data from input symbols, based on the status of the elements within an examination zone associated with each element of the digital image, comprising:

digitizer means responsive to the input symbols for providing a data stream digital image thereof;

data flow means for systematically advancing each element of the data stream digital image to an examination status, and holding the states of the elements within the examination zone associated with the examined element; and

logic means responsive to the states of the elements in the examination zone for widening the stroke width within

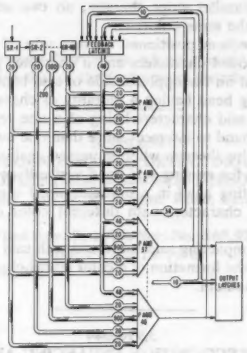
the digital image to a uniform width in accordance with a set of predetermined state conditions in the examination zone.

3,990,045

ARRAY LOGIC FABRICATION FOR USE IN PATTERN RECOGNITION EQUIPMENTS AND THE LIKE

William Francis Beausoleil, Hopewell Junction, and Richard Hiller, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 24, 1974, Ser. No. 482,824
Int. Cl.² G06K 9/06; H03K 19/08
U.S. Cl. 340—146.3 MA 7 Claims



1. A fabrication arrangement for use in a measurement element that detects characteristics of an input bit stream, the measurement element comprised of a plurality of LSI chips, each chip including

a portion of a shift register for the measurement element,

an input pin on the chip connected to an input of the shift register portion,

a programmable logic array (PLA) section, a set of inputs of the PLA section selectively connected to outputs of the portion of the shift register on the chip, and the PLA section having a plurality of outputs, the input bit stream being supplied to the PLA section from the shift register portion for bit stream detection operations,

a plurality of latches on the chip,

coupling means for connecting outputs of said latches to other inputs of the PLA section,

a plurality of latch input pins,

means for respectively connecting the latch input pins to inputs of the latches,

time multiplexing means for selectively connecting groups of PLA outputs of the PLA section to array output pins of the same chip, each group being connected to a different array output pin, the number of array output pins being substantially less than the number of PLA outputs,

a plurality of clocking pins, and

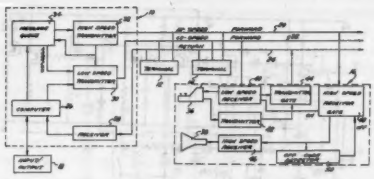
gating means for connecting inputs of the latches to the clocking pins, and the number of latches being at least equal to the number of PLA outputs in each group.

3,990,046

MULTIPLE TERMINAL COMPUTER SYSTEM WITH MIXED TERMINAL DATA RECEPTION RATES

Harold W. Katz; Gino Venturi; Melvin T. Bennett, and Allan I. Edwin, all of Ann Arbor, Mich., assignors to Interactive Systems, Inc., Ann Arbor, Mich.

Filed June 12, 1974, Ser. No. 478,643
Int. Cl.² H04Q 9/00
U.S. Cl. 340—147 R 13 Claims



1. A data communication system having a master station and a plurality of remote terminals capable of receiving data from the master station, including terminals having a first, relatively low data rate, and terminals having a second, relatively high data rate, a cable interconnecting the master station and the remote terminals; first multiplexer means connected to the cable at the master station and each of the remote terminals to form a first data channel having a relatively low maximum data rate connecting said master station to all of said terminals; second multiplexer means connected to the cable at the master station and each of the remote terminals to form a second data channel having a relatively high maximum data range connecting said master station to all of said terminals; unique address means associated with each terminal; means associated with said central station for transmitting the address of any terminal to all of said terminals over said first channel; means at at least certain of said terminals for selectively connecting the terminal to the second data channel; and means associated with said certain terminals, responsive to the address of such terminal and a unique code signal, both sent over said first data channel, for enabling said means for connecting such terminal to the second data channel.

3,990,047

BURST TRANSMISSION CONTROL SYSTEM

Jean-Pierre Sachs, Paris, and Jean-Claude Six, Sevres, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 16, 1975, Ser. No. 568,707
Int. Cl.² H04Q 9/14
U.S. Cl. 340—167 R 10 Claims

1. A signalling system comprising

a transmitter, including

a control keyboard for entering control information, including pairs of keys;

a clock signal generator;

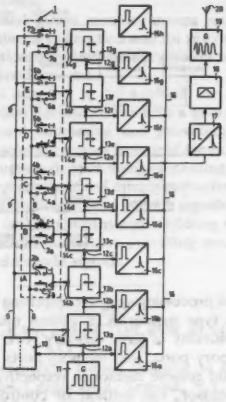
a bistable trigger circuit connected to said clock signal generator and having two complementary output leads;

a first monostable trigger circuit directly connected to said clock signal generator, directly connected to one of said complementary output leads, and having an output;

N monostable trigger circuits connected in cascade through said first monostable trigger circuit to said clock signal generator, where N is an integer, each of said N circuits including a corresponding terminal, for controlling the duration of the unstable state, connected through a corresponding pair of keys of said control keyboard to said two complementary output leads, each of said N circuits having an output;

N + 2 differentiating circuits, each of N of said differentiating circuits having an input connected to said respective

output of said N trigger circuits; one of said differentiating circuits having an input connected to the output of said first monostable trigger circuit; and one of said differentiating circuits having an input connected to said clock generator; each of said N + 2 differentiating circuits having an output, each of said outputs of said differentiating circuits being interconnected;



a shaping circuit, having an input connected to said interconnected outputs of said differentiating circuits, and an output; and

transmitting means connected to said output of said shaping circuit for transmitting a pulse signal.

3,990,048

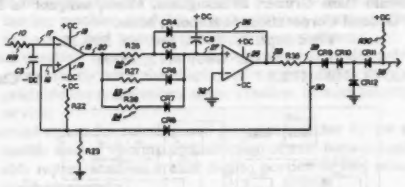
CARRIER DETECT CIRCUIT

Bruce R. Kanitz, Fairport, N.Y., and Charles L. Jacobson, Plano, Tex., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 418,530, Nov. 23, 1973, Pat. No. 3,909,516. This application May 27, 1975, Ser. No. 581,056

Int. Cl.² H04Q *9/16*

U.S. Cl. 340—171 R **2 Claims**



1. A detector circuit for providing an output signal a predetermined time after receipt of an input signal having an initial predetermined characteristic and for thereafter maintaining said output signal while said input signal remains within a predetermined range, said predetermined characteristic comprising repetitive periods of a first level component above a threshold level within said range and a second level component of relatively short duration outside said range; said detector circuit comprising

switching means for generating a first signal in response to said input signal being above said threshold level and a second signal in response to said input signal being below said threshold level,

a capacitor,

means responsive to a preselected voltage level on said capacitor for providing said output signal, and

charge control means responsive to said first signal to charge said capacitor at a first rate and responsive to said second signal to discharge said capacitor at a second rate, said first and second rates being selected to cause the voltage on said capacitor to reach said preselected voltage level whenever said input signal has said predetermined characteristic for said predetermined time.

3,990,049

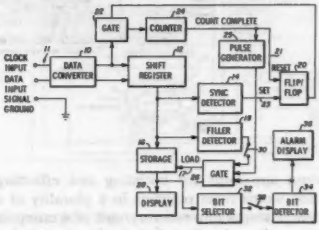
SELECTIVE DATA SEGMENT MONITORING SYSTEM

Manfred N. Wirth, Sunnyvale, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 12, 1975, Ser. No. 576,774

Int. Cl.² G06F *3/00*

U.S. Cl. 340—172.5 **10 Claims**



1. High speed data monitoring apparatus for connection to a data handling system to monitor a stream of data having a block format including a sequence of synchronizing data bits followed by a sequence of information data bits, and for displaying a selected segment of the data following said synchronizing data bits, comprising:

shift register means for receiving the stream of data and for developing a plurality of register contents signals corresponding respectively with the data states of the various data bits contained within said register means at any time;

means coupled to said shift register means for receiving clock pulses from said data handling system, said clock pulses controlling the contents signal shift rate in said shift register means;

synchronization detector means coupled to said shift register means for detecting a predetermined sequence of synchronization data bits in said shift register means and generating a synchronization detection signal when said sequence is detected;

means coupled to said receiving means for counting clock pulses input to said shift register means after said synchronization detection signal has been generated and for generating a count complete signal when a preselected number of clock pulses have been input to said shift register means;

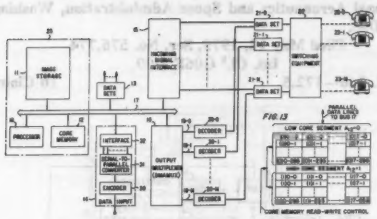
data storage means coupled to said shift register means for storing the contents signals existing at the time said count complete signal is generated; and

display means coupled to said data storage means for displaying the said existing contents signals stored in said storage means.

3,990,050
COMPUTER CONTROLLED AUTOMATIC RESPONSE SYSTEM

Nicholas John Kolettis, Hightstown; Kevin Christopher O'Brien, East Brunswick, and Gerald John Owens, Freehold, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 25, 1974, Ser. No. 509,129
Int. Cl.[2] G06F 3/04
U.S. Cl. 340—172.5 13 Claims



1. Output apparatus for initiating and effecting reading digital code words from registers in a plurality of dedicated buffer storage stages in a memory unit of a computer system to a corresponding plurality of output lines, wherein the registers have preassigned addresses identifying the individual buffer storage stages and the digital word locations within the buffer storage stages, which comprises:

monitoring means responsive to first prescribed address signals transmitted in the computer system when digital words are transferred from a mass storage unit to said registers in the buffer storage stages in the memory unit for generating output signals indicating individual ones of the dedicated buffer storage stages which include registers which have been loaded with digital words from said mass storage unit to be outputted;

first means for generating a predetermined sequence of output signals during first periodic intervals, first predetermined ones of said first means output signals being second address signals identifying the individual registers in the dedicated buffer storage stages;

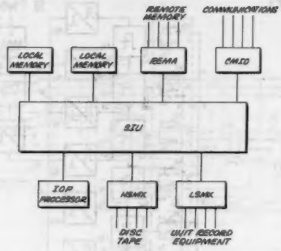
scanning means supplied with said output signals from said monitoring means and responsive to second predetermined ones of said sequence of first means output signals for sequentially generating initiation signals during second periodic intervals identifying buffer storage stages that have been loaded with digital words; and

means for generating a plurality of control signals, said control signals being employed to effect reading digital words from the registers in the loaded buffer storage stages in a prescribed sequence, said control signal generating means including means responsive to each of said initiation signals for normally generating a sequence of first predetermined ones of said control signals for causing reading of a digital word from a register in a loaded buffer storage stage corresponding to said second address signals being generated at the instant a corresponding one of said initiation signals is generated, wherein a digital word is read from a register in each of said loaded buffer storage stages during each of said second periodic intervals in response to corresponding ones of said initiation signals.

3,990,051
MEMORY STEERING IN A DATA PROCESSING SYSTEM

William A. Shelly, Phoenix, Ariz., assignor to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed Mar. 26, 1975, Ser. No. 562,313
Int. Cl.[2] G06F 13/00
U.S. Cl. 340—172.5 3 Claims



1. In a data processing system comprising a plurality of local and remote type memories, a system interface unit which includes a plurality of local memory ports and a plurality of remote memory ports, said memory ports connected to said local and said remote memories respectively, and an input-/output processor, the method of controlling data fetches employing a three part memory address comprised of:

a. generating in said input/output processor a first address portion indicating the type of memory to be accessed;

b. generating in said input/output processor a second address portion indicating which memory is to be accessed;

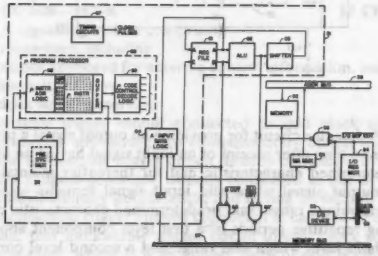
c. generating in said input/output processor a third address portion to verify the memory address is indicating the correct page table word and page number; and

d. obtaining by means of said interface unit the correct page table word and page number from remote memory if step c. does not verify that the correct page table word and page number was indicated.

3,990,052
CENTRAL PROCESSING UNIT EMPLOYING MICROPROGRAMMABLE CONTROL FOR USE IN A DATA PROCESSING SYSTEM

Ronald Hans Gruner, Framingham, Mass., assignor to Data General Corporation, Southboro, Mass.

Filed Sept. 25, 1974, Ser. No. 509,186
Int. Cl.[2] G06F 9/12, 13/06
U.S. Cl. 340—172.5 17 Claims



1. In a data processing system, including a main memory for storing data, a central processing unit for processing said data, a memory bus for transmitting said data between said main memory and at least said central processing unit, I/O means for transmitting said data between said system and outside of said system, said central processing unit including instruction

register means connected from said memory bus for supplying operational instructions within said central processing unit and a microprogram processor for aiding said processing, said microprogram processor comprising:

memory means containing individually addressable micro-instructions;

micro-instruction decode means connected from said memory means for deriving decode control signals from said micro-instructions;

means for addressing said memory means responsive to a current operational instruction and for providing the next micro-instruction from said memory means to said micro-instruction decode means;

coupling means adapted to be enabled for feeding said micro-instruction decode means with a micro-instruction direct from said addressing and providing means and derived from selected signals from said memory bus, and;

said micro-instruction decode means including logic means responsive to predetermined micro-instruction signals for (1) generating predetermined decode signals, and for (2) enabling said coupling means and inhibiting said addressing and next micro-instruction providing means with said predetermined decode signals.

3,990,053

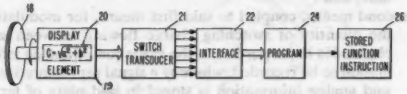
STORED PROGRAM SELECTOR FOR ELECTRONIC CALCULATOR

Bob O. Evans, Greenwich, Conn., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 15, 1973, Ser. No. 406,721

Int. Cl.[2] G06F 9/00

U.S. Cl. 340—172.5 **6 Claims**



1. In an electronic calculator, apparatus for selecting one of a plurality of stored programs for execution, comprising:

a rotatable program selector device such as a drum;

said program selector device having a display portion containing a plurality of human readable representations, each representing one of said plurality of stored programs,

said program selector device having a control portion containing machine readable representations corresponding to each of said human readable representations;

said machine readable representations being positionable concurrently with the display of corresponding human readable representations upon rotation of said selector device;

manual means for rotating said program selector device to enable human viewing and selection of said human readable representations in said display portion of said selector device; and

transducer means operable for generating a program start signal in response to a machine readable representation in said control portion of said program selector device corresponding to a manually selected human readable representation of a desired program.

3,990,054

MICROPROGRAM ORGANIZATION TECHNIQUES

Andrew A. Perlowski, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 5, 1974, Ser. No. 521,022

Int. Cl.[2] G06F 9/06, 13/00

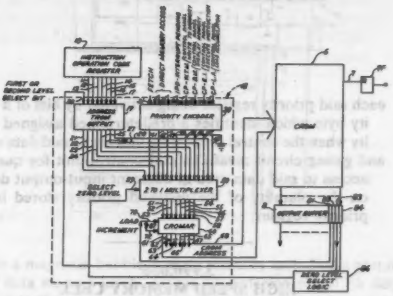
U.S. Cl. 340—172.5 **8 Claims**

1. In a data processor capable of processing data in accordance with a first macroinstruction and a second macroinstruction, improved apparatus for generating at least a first microinstruction and for generating at least a second microinstruction for use in combination with the first microinstruction for executing the second macroinstruction, comprising:

microinstruction memory means for storing the first microinstruction at a first address and the second microinstruction at a second address;

output means for storing the microinstructions read from the microinstruction memory means and for generating a first output signal in response to the absence of the first microinstruction from the output means and for generating a second output signal in response to the presence of the first microinstruction in the output means;

instruction register means for storing during a first time period a first operation code signal corresponding to at least a portion of the first macroinstruction and for storing during a second time period a second operation code



signal corresponding to at least a portion of the second macroinstruction; and

addressing means responsive during a first time period to the first operation code signal and the first output signal for reading the first microinstruction from the first address into the output means so that the execution of the first macroinstruction is enabled, and responsive during a second time period later than the first time period to the second operation code signal and the first output signal for reading the first microinstruction from the first address into the output means and responsive to the second operation code signal and the second output signal for reading the second microinstruction from the second address into the output means so that the execution of the second macroinstruction is enabled by the first and second microinstructions, whereby the first microinstruction stored at the first address is used to enable the execution of both the first and second macroinstructions.

3,990,055

CONTROL SYSTEM FOR MAGNETIC DISC STORAGE DEVICE

Edward E. Henderson, Philadelphia; Akira Fujimoto, Conshohocken, and Stanley E. Gaw, Roslyn, all of Pa., assignors to Sperry Rand Corporation, Blue Bell, Pa.

Filed Sept. 6, 1974, Ser. No. 503,780

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.[2] G06F 3/00

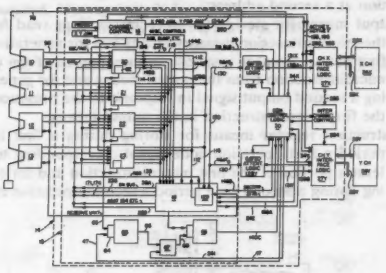
U.S. Cl. 340—172.5 **34 Claims**

1. In a data processing system which includes a plurality of rotatable input-output storage devices cooperating with a central processing unit, a data area locating and automatic queueing control system comprising:

a control unit connected between said input-output devices and said central processing unit which is operable to selectably interconnect an input-output device to the central processing unit,

a unit logic controller in said control unit for each input-output device,

priority control means in each said unit logic controller comprising a priority register,



each said priority register being activated by bits of a priority byte which identifies a predetermined assigned priority when the central processing unit seeks said data area,

and gating circuit means in said control unit for queueing access to said data area in different input-output devices on the plurality of the assigned priority stored in said priority register.

3,990,056

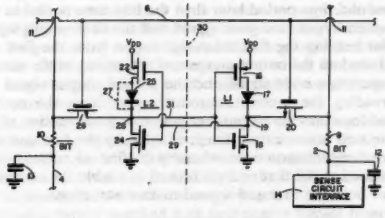
HIGH SPEED MEMORY CELL

James A. Luisi, Anaheim; Clarence W. Padgett, Fountain Valley, and Dana C. Street, Placentia, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Continuation-in-part of Ser. No. 513,367, Oct. 9, 1974, abandoned. This application Oct. 2, 1975, Ser. No. 618,982

Int. Cl.² G11C *11/40*

U.S. Cl. 340—173 R **27 Claims**



1. A memory cell for storing data having an address select line to activate said cell, a first data bus and a second data bus for writing information into said memory cell and for sensing the information stored therein, and including

first and second cross-coupled inverter means,

circuit means to connect said first and second cross-coupled inverter means to one another, and

first and second coupling means,

said first coupling means connected between said first cross-coupled inverter means and said first data bus,

said second coupling means connected between said second cross-coupled inverter means and said second data bus,

said second coupling means and said second cross-coupled inverter means exhibiting greater impedance than said first coupling means and said first cross-coupled inverter means in order to decrease the size and to improve the operating speed of the memory cell.

3,990,057

FERROELECTRIC ANALOG MEMORY DEVICE AND METHOD OF OPERATING THE SAME

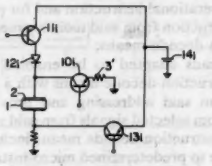
Akio Kumada, Kokubunji, Japan, assignor to Hitachi, Ltd., Japan

Filed Feb. 4, 1975, Ser. No. 546,928

Claims priority, application Japan, Feb. 4, 1974, 49-13725

Int. Cl.² G11C *11/22*

U.S. Cl. 340—173.2 **10 Claims**



4. An apparatus for recording analog information comprising:

a plate of ferroelectric material having electrodes disposed on the opposite surfaces thereof;

first means, coupled in series with said electrodes, for applying to said plate a voltage, the amplitude of which is equal at least to the threshold voltage necessary for switching the state of polarization of said plate of ferroelectric material and having a time width greater than the period for switching the state of polarization of said plate of ferroelectric material which corresponds to said amplitude; and

second means, coupled to said first means, for modulating the quantity of switching charge flowing between said electrodes in proportion to the gradation of analog information to be recorded, whereby a signal representative of said analog information is stored in said plate of ferroelectric material,

wherein said second means comprises at least one resistance element, the resistance of which is inversely proportional to the gradation of said analog information to be recorded.

3,990,058

MULTIPLE LOOP SHIFT REGISTER HAVING REDUNDANCY

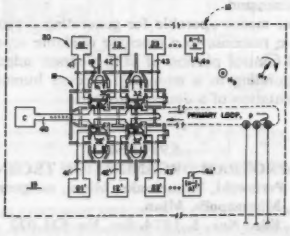
John L. Archer, Orange; Leonard Tocci, Laguna Niguel, and Thomas T. Chen, Yorba Linda, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 22, 1974, Ser. No. 499,718

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.² G11C *29/00, 11/14, 19/00*

U.S. Cl. 340—174 TF **11 Claims**



1. A serial shift register comprising,

a layer of magnetic material wherein single wall magnetic domains can be propagated,

a propagation loop defined by magnetic poles formed sequentially in a magnetically soft, patterned overlay on the magnetic layer in the presence of a cyclically varying, in-plane magnetic field,

at least one secondary propagation loop having ends for bubble domain entry and exit at points separated by at least one intervening magnetic pole of said propagation loop and defined by magnetic poles formed sequentially in said overlay in the presence of said cyclically varying in-plane magnetic field,

said secondary propagation loop having a pair of first magnetic poles at said entry and exit, and having at least a second magnetic pole adjacent said entry; and

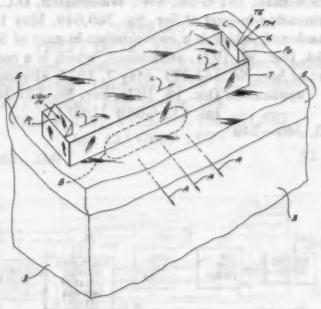
a conductor network connected to said overlay for applying electric current to portions of said overlay to selectively degrade the magnetic properties thereof and thereby eliminate selected ones of said intervening magnetic poles and said second magnetic poles in order to provide a single continuous propagation path.

3,990,059

MAGNETIC BUBBLE DETECTOR

James Thomas Carlo, Richardson, Tex., and Hon Wai Lam, Cambridge, Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 3, 1975, Ser. No. 565,027
Int. Cl.² G11C *11/14*
U.S. Cl. 340—174 TF **10 Claims**



1. A magnetic bubble detector comprising:

a planar layer of magnetic material in which magnetic bubble domains can be moved and having a magnetization perpendicular to the plane of the layer;

a thin planar film on one surface of said planar layer of magnetic material and having a magnetization in the plane of the film;

said planar layer of magnetic material and said planar film comprising a composite optical waveguide for the propagation of linearly polarized light therethrough along an axis of the waveguide;

means for coupling linearly polarized light into said waveguide;

means for stretching magnetic bubble domains in a direction transverse to their direction of movement as they are moved in the layer of magnetic material past the waveguide along a path intersecting with said waveguide and transverse to the axis thereof; and

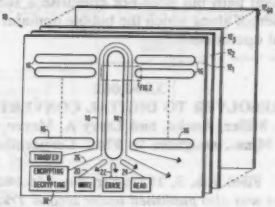
means for sensing changes in the polarization mode of the light propagating along the axis of the waveguide, the sensing means including means for coupling light out of said waveguide whereby the movement of a magnetic bubble domain along the path so as to intersect with said waveguide will modulate the polarized light propagating along the axis of the waveguide by the fringing field of the stretched magnetic bubble domain so as to provide a light output signal from the sensing means thereby indicating the passage of a magnetic bubble domain.

3,990,060

CRYPTOGRAPHIC MAGNETIC BUBBLE DOMAIN MEMORY

Yeong S. Lin, Mount Kisco; Chao N. Liu, and Donald T. Tang, both of Yorktown Heights, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 27, 1974, Ser. No. 455,425
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² G11C *11/14, 19/08*
U.S. Cl. 340—174 TF **14 Claims**



1. In a magnetic bubble domain memory including a plurality of data storage levels, means for entering plural bit data words into the memory in bit synchronism, with each word bit being represented by the presence or absence of a magnetic bubble domain, and means for moving the magnetic bubble domains within the data storage levels in cyclic steps along predetermined propagation paths, the improvement comprising means for encrypting the entered data words, comprising:

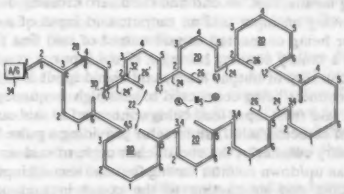
means for inhibiting the shifting of the magnetic bubble domains in a nondestructive manner and in cyclic steps in selected storage levels for a predetermined number of cyclic steps, such that the bits in each word are skewed or permuted to thereby destroy the bit synchronism in each word yet maintaining the bit synchronism in each storage level.

3,990,061

GAPLESS PROPAGATION STRUCTURES FOR MAGNETIC BUBBLE DOMAINS

Emerson W. Pugh, Mount Kisco, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 27, 1973, Ser. No. 429,018
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976
Int. Cl.² G11C *11/14, 19/08*
U.S. Cl. 340—174 TF **8 Claims**



1. A gapless, single-sided propagation structure for implementing the continuous, generally unidirectional movement of magnetic bubble domains in a supporting material in response to an externally applied, in-plane magnetic field rotating in a

constant circular direction through a plurality of phases, comprising:

a generally undulating, non-self-crossing strip of magnetic material having in-plane magnetization,

trapping means associated with each undulation at a discrete predetermined position thereon for momentarily holding a bubble substantially stationary at said position during at least two sequential phases of said magnetic field rotation as the magentic field continues to rotate, and

pole establishing means adjacent each trapping means for establishing a discrete magnetic pole for attracting a bubble from said position to thereby cause its continued, generally unidirectional movement into the next undulation,

wherein the magnetic bubble domains are propagated along the path defined by the undulating strip of magnetic material, and wherein the pole establishing means intersects said path but does not comprise a substantial portion thereof along which the bubble domains propagate in normal operation.

3,990,062

RESOLVER TO DIGITAL CONVERTER

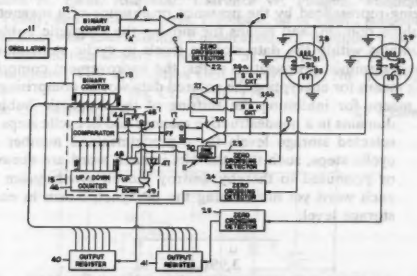
George W. Miller, Anoka, and Larry A. Meyer, Minneapolis, both of Minn., assignors to FMC Corporation, San Jose, Calif.

Filed Feb. 3, 1975, Ser. No. 546,665

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 20, 1976

Int. Cl.[2] G08C *19/48*

U.S. Cl. 340—198 **7 Claims**



7. A resolver to digital converter comprising a high frequency signal source; a frequency divider connected to said source, said divider providing a low-frequency signal; first and second filtering means for converting a low-frequency signal to a sinusoidal signal, each of said filtering means having an input and an output, said input of said first filtering means being connected to the output of said divider; a resolver having first and second stator windings and a rotor winding; said first stator winding being connected to said output of said first filtering means; first, second and third zero crossing detectors each having an input and an output, said input of said first detector being connected to said output of said first filtering means; a binary counter having a signal input, a reset input and a plurality of output leads, said signal input lead of said binary counter being connected to said high frequency signal source, said reset input lead being connected to said output of said first detector, said first detector providing a pulse to reset said binary counter at the end of each cycle of said sinusoidal signal; an up/down counter having first and second input leads for adding and subtracting to the count in said up/down counter and a plurality of output leads; first and second logic gates each having first, second and third input leads and an output lead, said output of said second zero crossing detector being connected to said first input lead of said first gate, a flip-flop, said flip-flop being connected between a first output lead of said binary counter and a second input lead of each of said first and said second gates, said output lead of said first gate being connected to said first input lead of said up/down counter; an inverter, said inverter being connected between said output of said second zero crossing detector and said first input lead of said second gate, said high frequency source being connected to said third input lead of each of said first and said second gates, said output lead of said second gate being connected to said second input lead of said up/down counter; a comparator having an output lead, said output leads of said binary counter and of said up/down counter being connected to said comparator, said comparator providing a pulse to said output lead each time the count of said binary counter matches the count of said up/down counter, said output lead of said comparator being coupled to said input of said second filtering means, said output of said second filtering means being connected to said second stator winding and to said input lead of said second zero crossing detector; and an output register having a plurality of signal input leads and a trigger input lead, said signal input leads of said register each being connected to a corresponding one of said output leads of said binary counter, said trigger input lead of said register being connected to said output of said third detector, said input of said third detector being connected to said rotor winding of said resolver.

3,990,063

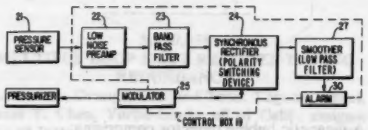
SYSTEM FOR MONITORING CHANGES IN THE FLUIDIC IMPEDANCE OR VOLUME OF AN ENCLOSURE

Mark Schuman, 101 G St., SW., Washington, D.C. 20024

Continuation-in-part of Ser. No. 360,049, May 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 213,994, Dec. 30, 1971, abandoned, which is a continuation-in-part of Ser. No. 141,171, May 7, 1971, abandoned. This application Dec. 10, 1974, Ser. No. 531,361

Int. Cl.[2] G08B *21/00*

U.S. Cl. 340—240 **62 Claims**



1. In an enclosure having at least one boundary region defining at least one bounded region wherein any bounded region has a lower fluidic impedance than any of its boundary regions, a monitoring system for detecting a change in the fluidic impedance of at least one of said boundary regions or for detecting the movement of a portion of at least one of said boundary regions of said enclosure comprising means for inducing a predetermined substantially uniform variation in pressure with respect to time within at least one bounded region of said enclosure, wherein the means for inducing includes means for varying the volume of at least one bounded region of said enclosure; means for monitoring deviation from said predetermined variation, and wherein the induced pressure variation is spatially substantially uniform within any said bounded region of said enclosure at most given instants in time during monitoring.

3,990,064
ALARM INDICATOR RESPONSIVE TO IMPROPER POSITION OF A CONTROL LEVER

Richard L. Jurgensen, 2201 Sherwood Drive, South Daytona, Fla. 32019

Filed Oct. 6, 1975, Ser. No. 619,961
Int. Cl.² G08B 21/00
U.S. Cl. 340—267 R 6 Claims

1. A warning device for use with an apparatus having a lever movable to a plurality of positions during operation of the apparatus, in which at least one position of the lever is undesirable, said device comprising:

sensing means operably associated with the lever, and arranged to sense the position of the lever,

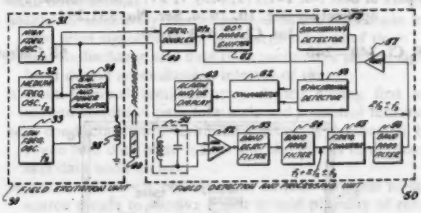
alarm means operatively connected to said sensing means, said alarm means responsive to said sensing means and serving to alert an operator when the lever is disposed in an undesirable position, and

disabling means operatively connected to said alarm means, to accomplish the inhibiting thereof under certain selected conditions, said disabling means being position sensitive.

3,990,065
THEFT DETECTION SYSTEM

Edwin C. Purinton, Oreland; Carl S. Holzinger, Coopersburg, and Robert Auger, Lansdale, all of Pa., assignors to The Magnavox Company, Fort Wayne, Ind.

Filed Feb. 20, 1975, Ser. No. 551,582
Int. Cl.² G08B 13/24
U.S. Cl. 340—280 12 Claims

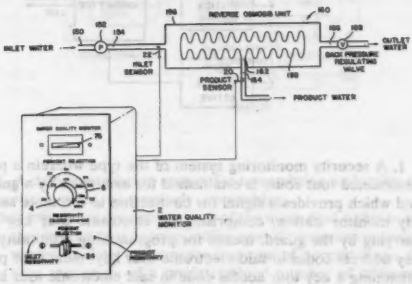


1. A detection system for detecting a presence of at least one of a plurality of objects at a preestablished location comprising: a plurality of marker tags, at least one marker tag coupled to each of said plurality of objects, each of said marker tags having a field controllable property; means for generating a field at said preestablished location, said field establishing a state of said field controllable property of said tag; and means for detecting the presence of said tag in the said preestablished location by monitoring an effect the said state of the said tag has on the total field in the said location, said means for detecting being capable of processing a signal that is a combination of frequencies dependent upon the state of said field controllable property, said field being composed of at least two different frequencies, a first frequency and a second frequency, each having amplitudes in the order of that necessary to cause said tag to move through said states of said field controllable property which can change said total field in the vicinity of said tag, and said net field of said at least two different frequencies being amplitude modulated by another third frequency in such a manner as to create a spinning field so that said tag can be detected within the preestablished location regardless of orientation of said tag while it is within the spinning field.

3,990,066
WATER QUALITY MONITOR

Arthur L. Malmgren, 386 NW. 112th St., Seattle, Wash. 98177

Filed Oct. 25, 1974, Ser. No. 517,854
Int. Cl.² G08B 21/00; B01D 35/00
U.S. Cl. 340—285 17 Claims



7. In a system for monitoring the performance of a reverse-osmosis water purifier wherein a first sensor measures the resistivity of product water leaving said purifier and a second sensor measures the resistivity of water entering said purifier, a phase-sensitive null detector comprising:

means for generating first and second AC signals on first and second AC signal lines, said AC signals having a predetermined phase difference;

a potentiometer having a first potentiometer resistance on one side of a potentiometer wiper and a second potentiometer resistance on the other side of said potentiometer wiper;

a wheatstone bridge having a first leg formed by said first sensor, a second leg formed by said second sensor, a third leg formed by said first potentiometer resistance and a fourth leg formed by said second potentiometer resistance, said bridge being powered by said first AC signal at the junction of said first sensor and said first potentiometer resistance and by said second AC signal at the junction of said second sensor and said second potentiometer resistance;

means for generating a null error signal having a value proportional to the difference between the voltage on said potentiometer wiper and the voltage at the junction of said first and second sensors;

a first current path for allowing current to flow from said first AC signal line to said second AC signal line;

a second current path for allowing current to flow from said second AC signal line to said first AC signal line;

indicating means for indicating a comparison between the current through said first current path and the current through said second current path;

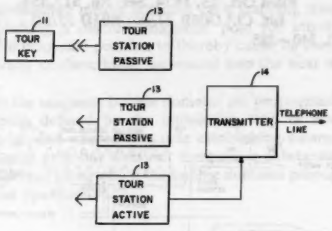
means responsive to a difference in voltage between said first error signal and one of said AC signals for allowing current to flow in said first current path; and

means responsive to a difference in voltage between said null error signal and the other of said AC signals for allowing current to flow in said second current path.

3,990,067
ELECTRONIC SECURITY TOUR SYSTEM

Charles Harrison Van Dusen, Boulder Creek, and Bruno Kaiser, Santa Cruz, both of Calif., assignors to Sentry Technology Incorporated, Santa Cruz, Calif.

Filed Sept. 30, 1974, Ser. No. 510,317
Int. Cl.² G08B 25/00
U.S. Cl. 340—306 **30 Claims**



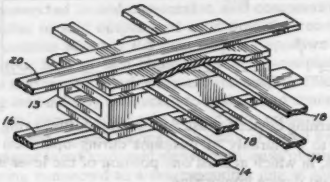
1. A security monitoring system of the type wherein a predetermined tour route is established for excursion by a guard and which provides a signal for connection to a remote security monitor station, comprising an electronic tour key for carrying by the guard, means for programming a plurality of key address codes in said electronic tour key, means for programming a key tour access code in said electronic tour key, a plurality of tour stations spaced along the predetermined tour route, means on each of said tour stations for plug-in electrical connection with said electronic tour key, means for programming a station tour access code in each of said plurality of tour stations, said station tour access being common to each of said tour stations defining the predetermined tour route, means for programming a predetermined station address code in each of said tour stations, said electronic tour key providing a tour information signal when plug-in electrical connection is made with a predetermined number of tour stations having station address codes matching ones of said key address codes, and having a station tour access code matching said key tour access code, means for receiving said tour information signal within a predetermined time window and for providing a security indication dependent upon receipt of said tour information signal, at least one of said plurality of tour stations being located for plug-in electrical connection at said predetermined number sequence on the tour route and having means for connecting said tour information signal to said means for receiving, so that said security indication is presented to the remote security monitor station.

3,990,068
PLASMA DISPLAY PANEL DRIVE SYSTEM

William N. Mayer, and Nicholas C. Andreadakis, both of White Bear Lake, Minn., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Jan. 26, 1976, Ser. No. 652,434
Int. Cl.² H01J 17/48
U.S. Cl. 340—324 M **4 Claims**

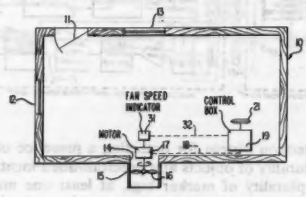
1. A plasma display element comprising:
an enclosure for containing a gas,
an ionizable gas within said enclosure,
a first write/erase conductor electrically insulated from said gas and capacitively coupled to said gas through a dielectric,
a second write/erase conductor parallel to said first write/erase conductor and electrically insulated therefrom, said conductor electrically insulated from said gas and capacitively coupled to said gas through a dielectric,
a first sustain conductor orthogonal to said write/erase conductors and electrically insulated therefrom, said conductor electrically insulated from said gas and capacitively coupled to said gas as through a dielectric,
a second sustain conductor parallel to said first sustain conductor and electrically insulated therefrom, said conductor being electrically insulated from said write/erase conductors and electrically insulated from said gas and capacitively coupled to said gas through a dielectric,
first electrical drive means associated with said first and second write/erase conductors for placing a predetermined voltage across said conductors in response to a control signal,
second electrical drive means associated with said first and second sustain conductors for placing a sustain pulse waveform on said conductors in response to control signals, for placing a predetermined write pulse signal on said conductors in response to control signals, and for placing predetermined erase pulse signals on said conductors in response to control signals.



3,990,069
SYSTEM FOR MONITORING CHANGES IN THE FLUIDIC IMPEDANCE OR VOLUME OF AN ENCLOSURE

Mark Schuman, 101 G St., SW., Washington, D.C. 20024

Continuation-in-part of Ser. No. 360,049, May 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 213,994, Dec. 30, 1971, abandoned, which is a continuation-in-part of Ser. No. 141,171, May 7, 1971, abandoned. This application Dec. 10, 1974, Ser. No. 531,294
Int. Cl.² G08B 21/00
U.S. Cl. 340—240 **68 Claims**



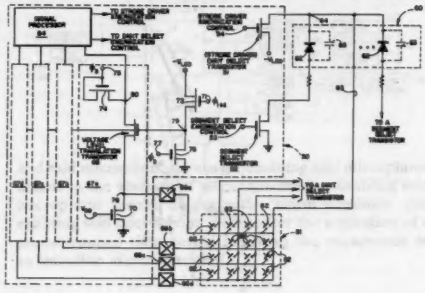
1. In an enclosure having at least one boundary region defining at least one bounded region wherein any bounded region has a lower fluidic impedance than any of its boundary regions, a monitoring system for detecting a change in the fluidic impedance of at least one of said boundary regions or for detecting the movement of a portion of at least one of said boundary regions of said enclosure comprising means for inducing a predetermined substantially uniform variation in pressure with respect to time within at least one bounded region of said enclosure, means for monitoring deviation from said predetermined variation, wherein the induced pressure variation is spatially substantially uniform within any said bounded region of said enclosure at most given instants in time during monitoring.

3,990,070

STROBING SCHEME AND KEYBOARD SENSING CIRCUIT FOR A ONE CHIP CALCULATOR

John R. Spence, Villa Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed June 23, 1975, Ser. No. 589,655
Int. Cl.[2] G09B 13/00
U.S. Cl. 340—337 11 Claims



1. A circuit to indicate the condition of a switch means having a first and a second switch condition, said circuit including:

source means to provide a plurality of reference potentials;

data node means;

means to selectively precharge said data node means to a first level signal during a precharge interval of time;

means to discharge said data node means to a second signal level during an evaluation interval of time;

a multi-terminal semiconductor device having first and second condition path terminals and a control terminal;

said conduction path terminals selectively connected between said data node means and the means to discharge said data node means;

means to selectively connect said control terminal to said source means to receive a first of said plurality of reference potentials during said precharge interval of time to disable said multi-terminal device and thereby maintain said data node means at the first signal level;

means to selectively connect said control terminal to said source means to receive a second of said plurality of reference potentials during said evaluation interval of time to enable said multi-terminal device in order to discharge said data node means to said second signal level;

said switch means rendered conductive in said first switch condition to selectively connect one of the conduction path terminals of said multi-terminal device to said source means to receive the second of said reference potentials and thereby disable said multi-terminal device;

said switch means rendered non-conductive in said second switch condition in order to enable said multi-terminal device during said evaluation interval; and

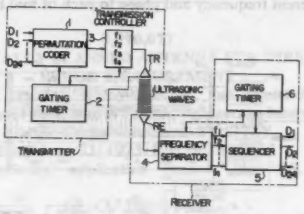
utilization means connected to said data node means and responsive to the signal level thereat during the evaluation interval of time so as to be indicative of the condition of said switch means.

3,990,071

DATA TRANSMISSION SYSTEM USING FREQUENCY PERMUTATION CODES

Tetsuo Ito, and Motohisa Nishihara, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 30, 1974, Ser. No. 502,195
Claims priority, application Japan, Aug. 31, 1973, 48-97157; Aug. 31, 1973, 48-97173
Int. Cl.[2] H03K 13/00; H04B 11/00
U.S. Cl. 340—347 DD 9 Claims



1. A data transmission system for transmitting a plurality of numerical codes, successively, comprising:

first means for converting each of the numerical codes to be transmitted to a corresponding one of permutation codes represented by a corresponding one of permutations, in time sequence, of a predetermined number of different frequency signals;

said first means including matrix means having memories for storing any one of said permutation codes in the form of a matrix, the contents of said memories representing, respectively, elements constituting said matrix so as to indicate the time sequence in transmission of said frequency signals of said one permutation code, means for storing a plurality of weight constants predetermined according to the number of bits constituting each of said numerical codes, means for calculating numerical values by processing said numerical code with respect to said weight constants, successively in order from a larger one to a smaller one of said weight constants, each of said numerical values representing the number of units of the corresponding weight constant contained in a residue of the numerical code after processing of the same with respect to the weight constants larger than said corresponding weight constant, and means for applying a specific one of said permutation codes to said matrix means and effecting shifting of the contents of selected memories in a predetermined mode, repeatedly, by a number of times whose number is dependent on said numerical values, thereby to obtain a new matrix indicative of the time sequence of said frequency signals corresponding to the permutation code of each numerical code,

second means for transmitting said different frequency signals in time sequence indicated by said new matrix, and

third means for receiving said frequency signals transmitted by said second means and converting said signals into numerical codes.

3,990,072

ACOUSTIC RESIDUE ALGEBRA DECODER

David K. Biegelsen, Woodside, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 9, 1974, Ser. No. 530,899
Int. Cl.[2] H03K 13/00
U.S. Cl. 340—347 DD 7 Claims

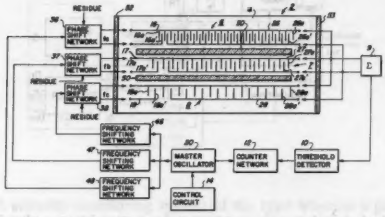
1. A decoder for decoding a group of numbers with the magnitude of the group being determined by selected residue base numbers comprising:

a substrate of a material capable of propagating acoustic surface waves,

a plurality of acoustic channels supported by said substrate, each said acoustic channel being associated with a different one of said residue bases and being comprised of an input transducer of interdigitated electrodes and an output transducer of interdigitated electrodes, the spacing of the electrodes of each of said acoustic channels being proportional to the residue base associated with that acoustic channel,

first means for supplying an oscillatory electrical signal of a different frequency and phase to each of said input transducers, the frequency and phase of the input signal supplied to each input transducer being proportional to the residue base associated with the acoustic channel of which that input transducer forms a part, and

second means for detecting when said oscillatory electrical signals produce simultaneously a pulse of maximum amplitude in each of said output transducers to thereby provide for decoding of one of said group of numbers by means of a counter which is started upon application of said oscillatory electrical signals and which is stopped when said oscillatory electrical signals produce simultaneously said pulse of maximum amplitude.



3,990,073

DIGITAL SIGNAL PROCESSING ARRANGEMENT USING A CASCADED INTEGRATOR FUNCTION GENERATOR

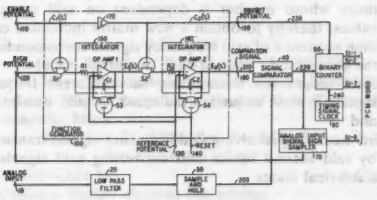
Donald Lars Duttweiler, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 22, 1974, Ser. No. 526,106

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976

Int. Cl.² H03K *13/20*

U.S. Cl. 340—347 AD **9 Claims**



1. In combination in a digital signal processing arrangement for producing a comparison signal corresponding to a predetermined piecewise linear segment companding law:

a first and a second integrator, each integrator having an input and an output terminal and operative for generating a ramp signal;

a sign potential terminal;

means for connecting said sign potential terminal to said input terminal of said first integrator;

means for connecting said output terminal of said first integrator to said input terminal of said second integrator; and

means for operating said first integrator substantially complemental to said second integrator to produce a piecewise linear segment signal.

3,990,074

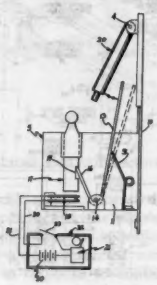
KILN ALARM ACTIVATED BY KILN SHUTOFF

Dominic P. Sondy, 1609 Mills Ave., North Muskegon, Mich. 49445

Filed Nov. 14, 1975, Ser. No. 631,957

Int. Cl.² G08B *19/00*

U.S. Cl. 340—417 **12 Claims**



1. In combination with a kiln and a kiln shut-off mechanism with a rotating shut-off weight, an alarm system mounted to the kiln including:

a bent actuator rod pivotally mounted so a first portion of the actuator rod is in the path of the rotating weight;

a vertically movable actuator weight mounted to engage and be supported by a second portion of the bent actuator rod when the actuator weight is displaced from its lowermost position;

an activating switch located in the vertical path of travel of the actuator weight and spaced from the wall of the kiln for completing an electrical connection; and

a signaling device connected in series with the activating switch for signaling the shut-off of the kiln.

3,990,075

SOLID STATE SECURITY SYSTEM

Lawrence S. Schmitz, Pittsburgh, and Warren D. Drumheller, Murrysville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 29, 1975, Ser. No. 581,619

Int. Cl.² G08B *19/00, 25/00*

U.S. Cl. 340—420 **6 Claims**

1. A solid state security system comprising,

at least one remote intrusion sensor circuit for producing intrusion alarm output signals in response to intrusion alarm conditions,

at least one remote fire sensor circuit for producing fire alarm output signals in response to fire alarm conditions,

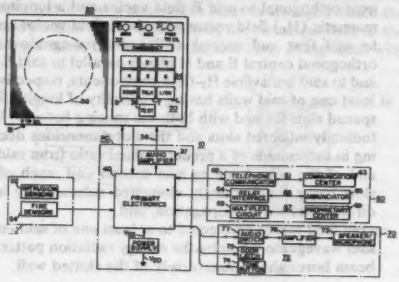
a remote monitoring center,

a local security console operatively coupling said remote fire sensor circuit and said remote intrusion sensor circuit to said remote monitoring center, said local security console including:

microphone means for providing verbal communication between said local security console and said remote monitoring center,

input circuit means operatively connected to said remote fire sensor circuit and said remote intrusion sensor circuit and responding to a fire alarm output signal by developing a first digitally modulated, frequency modulated digi-

tal audio waveform indicative of a fire alarm condition and responding to an intrusion alarm output signal by developing a second digitally modulated, frequency modulated digital audio output waveform indicative of an intrusion alarm condition, and control circuit means operatively connected between said input circuit means



and said microphone means for enabling said microphone means in the absence of alarm conditions, disabling said microphone means during a fire alarm condition and enabling said microphone means after the expiration of a predetermined time period following the occurrence of an intrusion alarm condition.

3,990,076

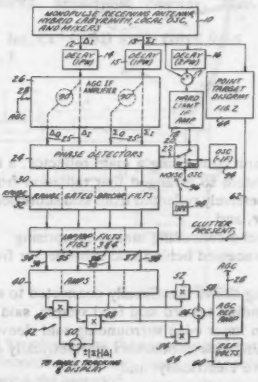
PSEUDO PULSE DOPPLER RADAR

Herbert H. Naidich, Trumbull, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed May 22, 1975, Ser. No. 580,000

Int. Cl.² G01S 9/42

U.S. Cl. 343—7.7 **8 Claims**



1. In a moving target indicating radar of the type including phase detectors in which target signals are phase detected and means responsive to radar return signals to provide signals for use as phase detector reference signals, said means providing signals derived from clutter in the presence thereof and derived from noise in the absence of clutter, the improvement comprising:

a dual mode filter responsive to the phase detected radar target signals, said dual mode filter being operable in first and second modes, alternatively in dependence on a control signal, said filter when operating in said first mode having a low pass characteristic which allows passage therethrough of detected signals having substantially zero doppler components as provided by detecting said radar target signals in response to noise in the reference channel, and when in said second mode having a bandpass characteristic which permits passage of doppler signals but not passage of DC and low frequency clutter components; and

means responsive to radar return signals for detecting the presence of clutter in a range bin other than the range bin in which the target is detected for providing said control signal to set said dual mode filter into said second mode in response to the presence of clutter.

3,990,077

ELECTRICALLY SCANNED ANTENNA FOR DIRECTION ERROR MEASUREMENT

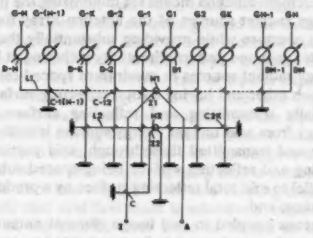
Louis Jean Beaulieu, L'Hay-les-Roses, and Daniel Edmond Beguin, Saint-Prix, both of France, assignors to International Standard Electric Corporation, New York, N.Y.

Filed June 23, 1975, Ser. No. 589,162

Claims priority, application France, June 28, 1974, 74.22636

Int. Cl.² H01Q 3/26

U.S. Cl. 343—854 **1 Claim**



1. An electronically scanned monopulse antenna used for direction error measurements and including an array of radiating sources, a first series network for feeding said sources through transmission lines and first couplers coupling these lines to the radiating sources by means of variable phase shifters, a second series network for feeding said sources through transmission lines and second couplers coupling these lines to the radiating sources by means of the corresponding first couplers, a first and a second hybrid junction to centerfeed the first and second network respectively, one of the sum or difference channels of the first junction providing the corresponding sum Σ or difference Δ excitation of the antenna and the other channel being coupled through a coupler to the similar channel of the second junction, this coupler distributing the other Δ or Σ excitation of the antenna, the said antenna being characterized in that the coupling coefficients of the various couplers used are chosen in such a way that, for each radiating source, the relation:

$$An\Delta = B(2n-1)An\Sigma$$

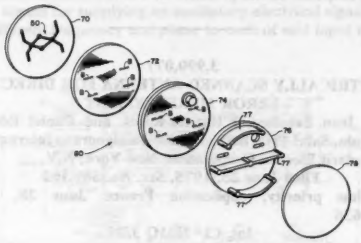
is confirmed, n being the row of the source counting from the center of the array, $An\Delta$ and $An\Sigma$ the excitation amplitudes of the row n radiating source corresponding respectively to the difference Δ and sum Σ excitations of the antenna, and B a constant.

3,990,078

IMAGE ELEMENT ANTENNA ARRAY FOR A MONOPULSE TRACKING SYSTEM FOR A MISSILE

Ernest C. Bellee; Robert C. Breithaupt; Donald L. Godwin, and Scott H. Walker, all of Scottsdale, Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Jan. 6, 1975, Ser. No. 538,619
Int. Cl.² H01Q *13/10, 15/00*
U.S. Cl. 343—770 6 Claims



1. In a monopulse tracking system for a missile or the like including an antenna array for transmitting and receiving signals indicative of the sum, azimuth and elevation signal information, the improvement comprising:

image element antenna means for minimizing the number of energy radiant sources of the antenna array for a given array aperture while providing substantially the same or greater gain and pattern directivity including at least four energy radiant sources in quadrature spaced relationship to each other and having a total reflecting surface, and a partially transmitting and reflecting surface whereby energy from said radiant energy sources is both reflected from and transmitted therethrough, said partially transmitting and reflecting surface being spaced substantially parallel to said total reflecting surface by a predetermined distance; and

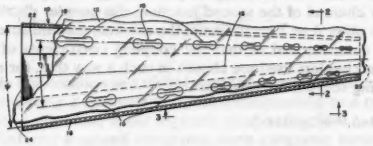
feed means coupled to said image element antenna means for coupling said signal to be transmitted to each of said energy radiant sources such that the signal to be transmitted is radiated from said image element antenna everywhere uniform in phase and said feed means having a plurality of outputs at which respectively is produced the sum, azimuth and elevation channel information in response to signals being received by said image element antenna means.

3,990,079

LOG-PERIODIC LONGITUDINAL SLOT ANTENNA ARRAY EXCITED BY A WAVEGUIDE WITH A CONDUCTIVE RIDGE

James J. Epis, Sunnyvale, Calif., assignor to GTE Sylvania Incorporated, Mountain View, Calif.

Filed June 23, 1975, Ser. No. 589,476
Int. Cl.² H01Q *13/10*
U.S. Cl. 343—771 12 Claims



1. A broadband antenna comprising

a closed electrically conductive TE-mode ridged waveguide linearly longitudinally tapered between a first end having a maximum cross-sectional dimension and a second end having a minimum cross-sectional dimension, said waveguide having a first wall from which a conductive ridge projects and a second wall opposite said first wall and being adapted to longitudinally propagate TE-mode electromagnetic waves having a transverse electric (E) field vector, a transverse magnetic (H_T) field vector component orthogonal to said E-field vector and a longitudinal magnetic (H_L) field vector with the E-field vector normal to said first and second walls, said waveguide having orthogonal central E and H planes parallel to said E-field and to said transverse H_T-field components, respectively,

at least one of said walls having a plurality of longitudinally spaced slots formed with both the spacing between longitudinally adjacent slots and the slot dimensions decreasing in increments of a predetermined ratio from said first end of the waveguide to said second end, each of said slots being longitudinally elongated substantially in the direction of wave propagation, and

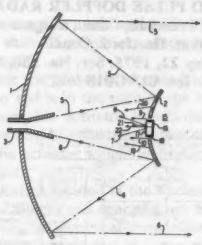
energy feed means connected to at least one of said ends of said waveguide whereby the energy radiation pattern is a beam boresighted transversely of the slotted wall.

3,990,080

ANTENNA WITH ECHO CANCELLING ELEMENTS

Carl William Lundgren, Jr., and George Walter Travis, both of Colts Neck, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 21, 1975, Ser. No. 597,368
Int. Cl.² H01Q *19/14*
U.S. Cl. 343—782 10 Claims



1. An antenna comprising a main reflector, a subreflector, and a feed system so arranged that radiation from said feed system is successively reflected from said subreflector and said main reflector, and

improved echo cancelling means comprising

a reflector recessed behind said subreflector from said feed system,

a conducting sleeve metallically connected to said reflector and extending toward said feed system, said subreflector having an inner edge surrounding said sleeve,

a grid of thin, wide conductors symmetrically connected to said sleeve electrically, and

means for preventing any part of said radiation from passing between said sleeve and said subreflector inner edge.

3,990,081

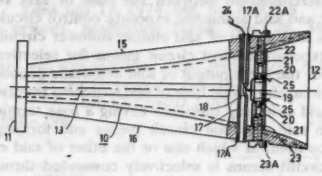
DOPPLER RADAR DEVICE

Serge Guennou, Croissy-sur-Seine, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 7, 1975, Ser. No. 547,994
Claims priority, application France, Feb. 11, 1974, 74.4466
Disclosure was also published under second Trial Voluntary Protest Program on Jan. 20, 1976
Int. Cl.² H01Q *13/02*
U.S. Cl. 343—786 4 Claims

1. A Doppler radar device which transmits a linearly polarized electromagnetic wave which is radiated by means of an

aerial which is formed by a flared horn having a rectangular cross-section, the smaller sides thereof being parallel to the direction of the electrical field of the radiated wave, and which detects the Doppler-frequency signal resulting from the reception of the wave reflected by a moving object by means of a semiconductor diode which is arranged in the said horn, characterized in that a conductive body is arranged inside the horn and parallel to the direction of the electrical field of the transmitted wave, the width of the said body being small with



respect to the width of the horn and the body occupying the entire "height" of the horn at the area where the body is arranged, the said body being situated in the horn at a distance from the horn opening which is larger than the distance between the semiconductor diode and the said opening, the said semiconductor diode being arranged parallel to the direction of the electromagnetic field and in a region where the intensity of the electrical field of the radiated wave is attenuated by the presence of the said conductive body.

3,990,082

METHOD AND MEANS FOR RECORDING OF INFORMATION

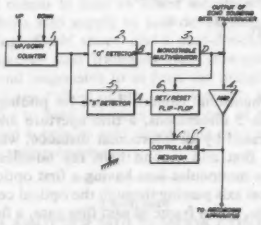
Kjell Oystein Ramberg, Horten, Norway, assignor to Simrad A.S., Horten, Norway

Filed Mar. 19, 1975, Ser. No. 559,775

Claims priority, application Norway, Mar. 21, 1974, 1012/74

Int. Cl.² G01D *9/00;* **G01S** *9/66*

U.S. Cl. 346—1 **14 Claims**



1. A method for controlling the recording of auxiliary information on a recording medium along with echo sounding signals, comprising the steps of:

storing data representative of said auxiliary information;

changing the value of the stored data;

detecting a first predetermined value of the stored data and generating a first signal indicative thereof;

detecting a second predetermined value of the stored data and generating a second signal indicative thereof;

generating a marking signal representative of said auxiliary information in response to said second signal;

amplifying said marking signal and the echo sounding signals for recording;

reducing the amplitude of the echo sounding signals in response to said first signal; and

restoring the amplitude of said echo sounding signals after a period determined by the interval between said first and second signals, whereby said marking signal is recorded on said recording medium and the normal record adjacent said marking signal provides a contrasting background thereto.

3,990,083

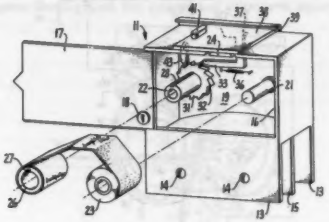
DEVICE FOR RECORDING PATIENT CARE

David F. Webster, 1325A Edwards Ave., Santa Rosa, Calif. 95401

Filed Oct. 14, 1975, Ser. No. 621,851

Int. Cl.² G01D *9/00, 15/24*

U.S. Cl. 346—41 **13 Claims**



1. In a recording device having a receptacle which includes a side wall, a side door, end walls, a top wall and a bottom wall, a pair of spaced shafts mounted on said side wall, the top of the receptacle having a slidable door mounted thereon to be movable between a closed and an open position in which open position a first section of a roll of tape is exposed for recording a written message by a user, the tape extending between the two shafts and over a support for the tape, a first one of said shafts having rotating means thereon for rotating said first shaft to advance the tape over the support from the second shaft to the first shaft, engaging means connected to said slidable door and engaged with said rotating means in a manner such that said first shaft is selectively rotated upon movement of the slidable door from its closed to its open position to move the first tape section out of the exposed position and into a location whereat it is accessible only to authorized persons and whereat said first section is hidden from view and a new section of tape is exposed for recording a message by the user.

3,990,084

INFORMATION CARRIER

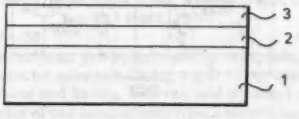
Hansjoachim Hamisch, and Hans-Jürgen Kaiser, both of Berlin, Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Nov. 25, 1974, Ser. No. 527,161

Claims priority, application Germany, Nov. 26, 1973, 2358859

Int. Cl.² G01D *15/34*

U.S. Cl. 346—135 **5 Claims**



1. For use in a system for recording information by exposure of a substance that can be burned away or vaporized with high-energy radiation, particularly a laser beam, a recording medium comprising a sheet-like support and an opaque layer applied to one side of the said support, the said opaque layer being an amorphous mixture of bismuth and selenium in a weight ratio between the ratios of 2 : 5 and 2 : 7, respectively.

3,990,085

MEASUREMENT MODE INTERLOCK MECHANISM IN CAMERA TTL LIGHT MEASURING SYSTEM

Tetsuji Shono, Saitama, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

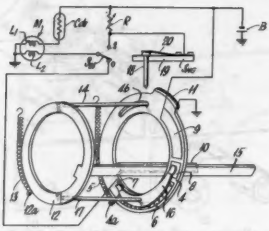
Filed Oct. 16, 1974, Ser. No. 515,135

Claims priority, application Japan, Oct. 19, 1973, 48-122179[U]

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² G03B *7/20*

U.S. Cl. 354—46 **6 Claims**



1. In a single lens reflex camera including a through the lens light measuring network provided with alternatively actuatable fully open and stopped down aperture light measuring first and second circuits and a current meter responsive to the incident light; manually operative selector means for selectively alternatively actuating said first and second light measuring circuits, objective lenses interchangeably mounted on said camera and provided with means for identifying said respective lenses as being alternatively of the fully open aperture light measuring type and of the stopped down aperture type respectively, and means responsive to the concurrent mounting of an objective lens identified as a fully open aperture type and to the manual selection of said second circuit for disabling the light measuring operation of said network, said selector means being operable independently of the objective type of mounted on said camera lens.

3,990,086

SHUTTER CONTROL CIRCUIT FOR CAMERAS

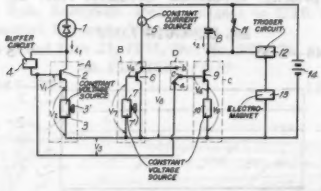
Chiharu Mori, and Masahiro Kawasaki, both of Tokyo, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan

Filed May 13, 1974, Ser. No. 469,526

Claims priority, application Japan, May 15, 1973, 48-56233[U]

Int. Cl.² G03B *7/08*

U.S. Cl. 354—51 **11 Claims**



1. In a camera shutter control circuit, timing circuit means for participating in the determination of exposure time, switching circuit means including a switching transistor having a collector, an emitter, and a base, and said switching circuit means also including a first constant voltage source means connected to said emitter, manual exposure control circuit means including an emitter-follower circuit, having a transistor complementary to said switching transistor, a second constant voltage source means coupled to said emitter-follower circuit, and manually operable means connected to said second voltage source means for setting the voltage level of said second constant voltage source means for setting the voltage level of said second constant voltage source means in accordance with the desired exposure time, said emitter-follower circuit having an output, automatic exposure control circuit means for automatically determining the exposure time based upon exposure-determining factors, and selection circuit means interconnected between the base of said switching transistor and said automatic exposure control circuit means as well as said output of said emitter-follower circuit of said manual exposure control circuit means for selectively coupling either the latter output or said automatic exposure control circuit means to said base of said switching transistor, said base of said switching transistor having a base terminal connected to said selection circuit means and forming a low impedance point at which one or the other of said exposure control circuit means is selectively connected through said selection circuit means to said switching circuit means and through the latter to said timing circuit means.

3,990,087

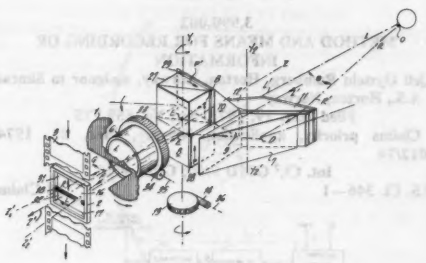
3-DIMENSIONAL CAMERA

Alvin M. Marks, and Mortimer Marks, both of c/o Marks Polarized Corp. 153-16 10th Ave., Whitestone, N.Y. 11357

Filed Oct. 21, 1974, Ser. No. 516,676

Int. Cl.² G03B *35/08*

U.S. Cl. 354—117 **28 Claims**



1. In a 3-dimensional camera device for photographing an object space in 3 dimensions, a first aperture and a second aperture separated by an interocular distance, which respectively receive first and second light ray bundles from said object space, a monocular lens having a first optical axis and a second optical axis passing through the optical center of said lens, a film gate, a film frame at said film gate, a first aperture first deflector, and a first aperture second deflector, to deflect the said first light ray bundle from the said first aperture along said first optical axis, a second aperture first deflector and a second aperture second deflector to deflect the second light ray bundle from said second aperture along said second optical axis, a first set of mutually extinguishing filters located between the said lens and said first and second apertures, a second set of mutually extinguishing filters located at said film gate dividing said film gate into a first area coinciding with the plane of the image of the object space carried by the first light ray bundle, and a second area coinciding with the plane of the image of the object space carried by the second light ray bundle, said first area and said second areas being adjacent at the said film gate, said first optical axis passing through center of said first area and the optical center of said lens, and said second optical axis passing through the center of the said second area and the optical center of said lens, said first and second sets of mutually extinguishing filters causing said first light ray bundle to be transmitted only to said first area and to be excluded from said second area, and causing said second

light ray bundle to be transmitted only to said second area and to be excluded from said first area.

3,990,088

SYSTEM FOR CONTROLLING REPLENISHMENT OF DEVELOPER SOLUTION IN A PHOTOGRAPHIC PROCESSING DEVICE

Nobuhiro Takita, Kyoto, Japan, assignor to LogEtronics Inc., Springfield, Va.

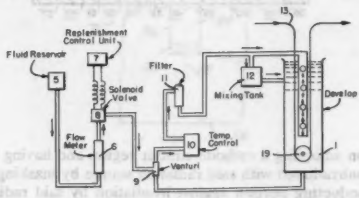
Filed July 17, 1974, Ser. No. 489,328

Claims priority, application Japan, Nov. 28, 1973, 48-134220

Disclosure was also published under second Trial Voluntary Protest Program on Jan. 20, 1976

Int. Cl.² G03D *13/00*

U.S. Cl. 354—298 **15 Claims**



9. In a film processor of the type comprising developing, fixing, and washing tanks, means for transporting exposed film along a predetermined path from the input of said processor through said tanks in succession to the output of said processor, a supply of replenishment fluid, and control means operative to selectively feed fluid from said supply to replenish the developer in said developing tank thereby to compensate for the lowered activity of said developer resulting from the processing of said film, the improvement comprising a pre-development sensor disposed adjacent said transport path upstream of said developing tank and responsive to at least the presence of a sheet of film at the processor input for activating said control means to feed an initial increment of replenishment fluid from said supply to said developing tank prior to the processing of said sheet, and a post-development sensor disposed adjacent said transport path downstream of said fixing tank and responsive to at least the image density in at least one processed sheet of film for selectively activating said control means to feed a further increment of replenishment fluid from said supply to said developing tank subsequent to the film processing operation.

3,990,089

CAMERA SHUTTER MULTI-MODE CONTROLLER PROVIDING IN ONE MODE A POWER-SAVING INTERVAL

Fumio Urano, Omiya, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 29, 1975, Ser. No. 626,967

Claims priority, application Japan, Nov. 2, 1974, 49-126795

Int. Cl.² G03B *9/34, 9/58*

U.S. Cl. 354—242 **2 Claims**

1. In a camera having a shutter including a leading curtain and a follower curtain for defining an exposure operation in which initially the leading curtain is released from a wound-up position to translate to an end position, and in which after the release of the leading curtain the follower curtain is released to translate behind the leading curtain, an electro-mechanical controller comprising:

an electrical portion;

a mechanical portion; and

an electromagnet serving as a transducer between the electrical and mechanical portions;

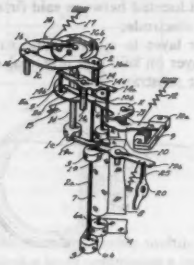
the electrical portion including:

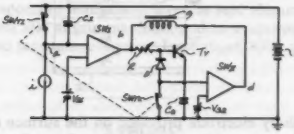
a. variable-delay timing circuit means for producing a first signal defining a computed exposure interval.

b. fixed-delay timing circuit means for producing a second signal defining a predetermined time interval;

c. switching circuit means responsive to the first and second signals for switchably providing energization current to the electromagnet in either a first mode or second mode of operation;

the switching circuit means operating in its first mode of operation in the event that the computed exposure interval is shorter than the predetermined time interval, and, in the course of this mode, providing the energization current throughout the computed exposure interval;





the switching circuit means operating in its second mode of operation in the event that the computed exposure interval is longer than the predetermined time interval, and, in the course of this mode, providing the energization current for first and second sub-intervals separated by a power-saving interval during which the electromagnet is de-energized; and

the mechanical portion including:

a. first stop means for controlling the release of the follower curtain when the switching circuit means operates in its first mode; and

b. second stop means for controlling the release of the follower curtain when the switching circuit means operates in its second mode of operation.

3,990,090

SEMICONDUCTOR CONTROLLED RECTIFIER

Yoshio Terasawa, and Shin Kimura, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 12, 1974, Ser. No. 460,479

Claims priority, application Japan, Apr. 18, 1973, 48-43134

Int. Cl.² H01L *29/74*

U.S. Cl. 357—38 **6 Claims**

1. A semiconductor controlled rectifier comprising:

a semiconductor substrate having a pair of opposite principal surfaces and having, between said principal surfaces, a first layer of one conductivity type, a second layer of the other conductivity type disposed adjacent to said first layer to form a first PN junction therebetween, a third layer of said one conductivity type disposed adjacent to said second layer to form a second PN junction therebetween, and a fourth layer of said other conductivity type disposed adjacent to said third layer to form a third PN junction therebetween, the exposed surfaces of said first and second layers forming one of said principal surfaces

and the exposed surface of at least said fourth layer forming the other principal surface;

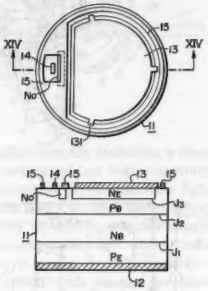
a first main electrode in contact with at least said first layer in said one principal surface of said semiconductor substrate;

a second main electrode in contact with at least said fourth layer in said other principal surface of said semiconductor substrate;

a gate electrode provided on the surface of said second layer in said one principal surface of said semiconductor substrate and separated from said first main electrode;

a small region of said one conductivity type formed in said second layer with its surface exposed, separated from said first main electrode, said gate electrode and said first layer, and located between said first main electrode and said gate electrode;

a conductor layer to connect said small region with said second layer on said one principal surface of said semiconductor substrate; and



an auxiliary electrode provided on the surface of said second layer in said one principal surface of said semiconductor substrate and having a first portion separated from said gate electrode, said gate electrode being disposed between said first main electrode and said auxiliary electrode, and a second portion disposed adjacent but spaced apart from said first main electrode at a place remote from the place where said first main electrode and said conductor layer face each other; and

wherein the spacing between the second portion of said auxiliary electrode and said first main electrodes is reduced at proscribed portions thereof, decreasing the impedance between said auxiliary electrode and said first main electrode to thereby by-pass displacement current and leakage current in the substrate adjacent the gate electrode by way of said auxiliary electrode to said first main electrode; and

wherein said first main electrode is extended beyond said first PN junction onto said second layer at least at a portion of the area where said first main electrode and said second portion of said auxiliary electrode face each other.

3,990,091

LOW FORWARD VOLTAGE DROP THYRISTOR

Michael W. Cresswell, Pittsburgh, and John S. Roberts, Export, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

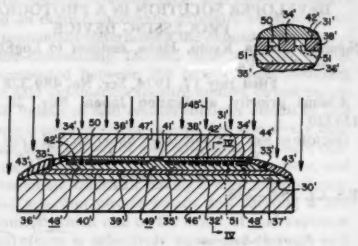
Continuation of Ser. No. 354,620, April 25, 1973, abandoned. This application Jan. 10, 1975, Ser. No. 540,208

Int. Cl.² H01L *29/74, 7/00*

U.S. Cl. 357—38 **6 Claims**

1. A thyristor comprising:

semiconductor body having disposed therein a cathode-base region with an impurity concentration at the working point below 5×10^{15} per cm^3 and having a gating portion and a conducting portion, said gating portion adjoining a major surface of the semiconductor body and having been irradiated with a radiation source to decrease gate sensitivity of the thyristor, and said conducting portion adjoining a cathode-emitter region and having been nonirradiated with said radiation source by masking said conducting portion against irradiation by said radiation source to maintain forward voltage drop of the device.



3,990,092

RESISTANCE ELEMENT FOR SEMICONDUCTOR INTEGRATED CIRCUIT

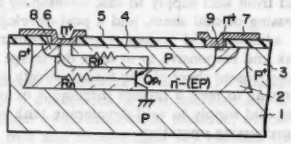
Masayoshi Yoshimura, Tokyo, Japan, assignor to Hitachi, Ltd., Japan

Filed Jan. 13, 1975, Ser. No. 540,340

Claims priority, application Japan, Jan. 11, 1974, 49-5959; Feb. 8, 1974, 49-15451

Int. Cl.² H01L *27/04*

U.S. Cl. 357—51 **10 Claims**



1. A resistance element for a semiconductor integrated circuit comprising:

a semiconductor substrate of a first conductivity type;

a first semiconductor region of a second conductivity type, opposite said first conductivity type, disposed in a first surface portion of said semiconductor substrate;

a second semiconductor region of said first conductivity type disposed in a portion of the surface of said first semiconductor region;

a first electrode conductivity connected to both said first and second semiconductor regions at a first end portion of said second semiconductor region; and

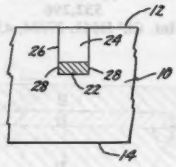
a second electrode conductively connected to each of said first and second semiconductor regions at the other end portion of said semiconductor region opposite said one end thereof; and wherein

the resistance of said first semiconductor region between said first and second electrodes is greater than that of said second semiconductor region.

3,990,093
DEEP BURIED LAYERS FOR SEMICONDUCTOR DEVICES

Harvey E. Cline; Thomas R. Anthony, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 411,014, Oct. 30, 1973, abandoned. This application Feb. 26, 1975, Ser. No. 553,170
Int. Cl.² H01L *29/78, 29/06, 29/04, 23/48*
U.S. Cl. 357—60 **39 Claims**



1. A semiconductor device comprising

a body of semiconductor material having a first type conductivity, a predetermined level of resistivity, a vertical axis aligned substantially with a first preferred crystal axis of the material of the body and two major opposed surfaces which are, respectively, the top and bottom surfaces of the body, at least one of the major surfaces having a preferred planar crystal orientation which is one selected from the group consisting of (100), (110) and (111);

a layer of electrically conductive metal disposed entirely within the body between, and parallel with the two major opposed surfaces and having at least one major surface, and

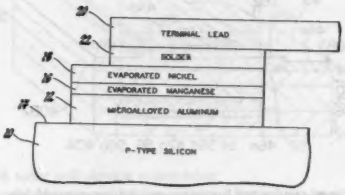
a region consisting of recrystallized semiconductor material of the body having solid solubility of at least the electrically conductive metal therein disposed in the body and extending between one opposed major surface of the body and the major surface of the layer of metal, and having a vertical axis aligned substantially with the first preferred crystal axis of the material of the body and two opposed end surfaces, one end surface is coextensive with the major surface of the body and the other end surface is coextensive with the at least one major surface of the layer, the region having a predetermined type conductivity which is one selected from the group consisting of P-type, N-type and intrinsic and a predetermined level of resistivity, wherein

the metal layer and the region are formed in situ by the migration of a melt of metal-rich semiconductor material of the body through the body of predetermined distance from that major surface by thermal gradient zone melting at a predetermined elevated temperature along a thermal gradient substantially parallel with the vertical axes of the body and the region, and terminating the migration of the melt at that predetermined distance into the body and solidifying the melt to form the region having a substantially uniform distribution of the metal throughout the entire region, the level of concentration of the metal being determined by the solid solubility limit of that metal in that semiconductor material at that predetermined elevated temperature of migration and to also form the metal layer, the metal comprising at least one dopant impurity material to impart the predetermined type conductivity and level of resistivity to the region.

3,990,094
EVAPORATED SOLDERABLE MULTILAYER CONTACT FOR SILICON SEMICONDUCTOR

Mark L. Konantz, Indianapolis, and Ronald K. Leisure, Kokomo, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 20, 1975, Ser. No. 605,979
Int. Cl.² H01L *23/48*
U.S. Cl. 357—71 **2 Claims**

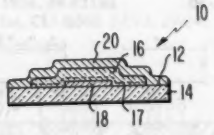


1. A strong low resistance solderable multilayer electrode on a silicon semiconductor body comprising a semiconductive body of silicon having a surface, a microalloyed layer of aluminum on said surface in low electrical resistance contact therewith, an evaporated manganese layer on said aluminum layer at least about 800 angstroms thick, and an evaporated nickel layer on said manganese layer at least about 3000 angstroms thick.

3,990,095
SELENIUM RECTIFIER HAVING HEXAGONAL POLYCRYSTALLINE SELENIUM LAYER

Charles John Busanovich, Princeton, N.J., and Robert Milton Moore, Carmel, Ind., assignors to RCA Corporation, New York, N.Y.

Filed Sept. 15, 1975, Ser. No. 613,356
Int. Cl.² H01L *29/161, 29/48*
U.S. Cl. 357—15 **11 Claims**



1. An electrical device having a rectifying junction comprising:

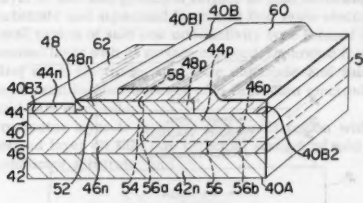
an electrode of a material selected from the group consisting of the n type semiconductors and the metals having a low work function below about 5 eV., and

a layer of hexagonal polycrystalline selenium over said electrode and having a surface region, in intimate proximity to said electrode, including an effective level of tellurium whereby a mechanically stable rectifying junction is achieved between said layer and said electrode; said rectifying junction being reversed biased upon the application of a positive electric potential to said electrode and a negative electric potential to said selenium layer.

3,990,096
SEMICONDUCTOR LUMINESCENT DEVICE

Hirofumi Namizaki, and Akiko Ito, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

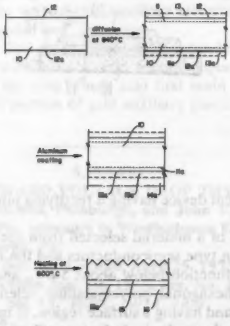
Filed Aug. 25, 1975, Ser. No. 607,505
Claims priority, application Japan, Aug. 26, 1974, 49-97771
Int. Cl.² H01S *33/19*, *29/161*
U.S. Cl. 357—18 10 Claims



1. A semiconductor luminescent device comprising, a semiconductive body having a pair of opposite major surfaces and including a first semiconductor layer made of a first semiconductive material, a second and a third semiconductor layers made of a second semiconductive material and having said first semiconductor layer sandwiched therebetween, each of said first, second and third semiconductor layers including a first type conductivity region and a second type conductivity region defining a *p–n* junction therebetween, said second semiconductive material having a forbidden band-width broader than that of said first semiconductive material and an electric resistivity higher than that of said first semiconductive material by at least two orders of magnitude, and a pair of first and second metallic electrodes located on said semiconductive body, said first metallic electrode being connected to said first type conductivity region of said first semiconductor layer with a low resistance, and said second metallic electrode being connected to said second type conductivity region of said first semiconductor layer with a low resistance.

3,990,097
SILICON SOLAR ENERGY CELL HAVING IMPROVED BACK CONTACT AND METHOD FORMING SAME

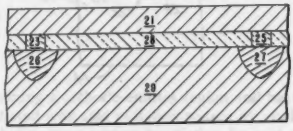
Joseph Lindmayer, Bethesda, Md., assignor to Solarex Corporation, Rockville, Md.

Filed Sept. 18, 1975, Ser. No. 614,619
Int. Cl.² H01L *27/14*
U.S. Cl. 357—30 5 Claims

1. A silicon wafer adapted for use in forming a silicon solar energy cell, comprising a relatively thin, substantially flat wafer of crystalline silicon having opposed front and back surfaces, a zone of diffusant extending into the wafer from the front surface thereof and forming an electrical junction in said wafer, and another zone composed of aluminum and silicon extending into said wafer from the back surface thereof and forming another junction therein, said zones being of opposite polarities and being separated by a zone of substantially undiffused silicon, and an electrically conductive film containing aluminum, oxygen and diffusant contiguous with said back surface of said wafer.

3,990,098
STRUCTURE CAPABLE OF FORMING A DIODE AND ASSOCIATED CONDUCTIVE PATH

Sebastian Vito Rocco Mastrangelo, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Co., Wilmington, Del.

Continuation-in-part of Ser. No. 317,382, Dec. 22, 1972, Pat. No. 3,864,715. This application Dec. 12, 1974, Ser. No. 532,296
Int. Cl.² H01L *27/04*, *45/00*
U.S. Cl. 357—2 29 Claims



1. Layered structure comprising
a. a semiconductor body having a surface region of a given conductivity type,
b. an electrically switchable coating on the surface region, said coating, upon being switched ON, providing an electrically conductive path through the coating to the surface region, and
c. a diode in the zone of contact between the coating and the surface region,
said coating before activation being a dispersed metal particle-polymer coating in contact with said surface region, the metal of said metal particles being capable of inducing a different type of conductivity in said surface region, said metal particles before activation being insulatively encapsulated and being present in the coating in an amount sufficient to provide electrical conductivity through the coating to said surface region and to form a diode in the zone of contact between said coating and said semiconductor body surface region upon application of an activating voltage to the layered structure, said diode being formed between said surface region of a given conductivity type and a portion of said surface region doped with said metal of said metal particles to be of different conductivity type to said conductivity type.

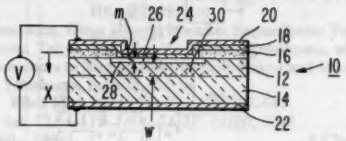
3,990,099
PLANAR TRAPATT DIODE

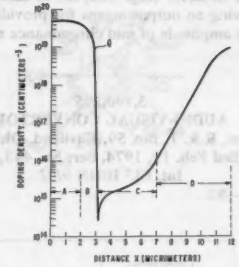
Ferdinand Carl Duigon, East Brunswick, and Shing-gong Liu, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 5, 1974, Ser. No. 529,909
Int. Cl.² H01L *29/90*, *27/02*, *29/04*, *29/06*
U.S. Cl. 357—13 8 Claims

1. A planar TRAPATT diode capable of generating RF power at microwave frequencies comprising:
a single crystal semiconductor substrate comprising a moderately doped first region of a first conductivity type and a heavily doped second region of the first conductivity type adjacent to the first region;
a layer of a dielectric having at least one aperture therein disposed on the first region;
a diffusing layer having impurities of an opposite conductivity type disposed on the dielectric and disposed inside the aperture in the dielectric sealing said aperture;
a heavily doped third region of the substrate, having an opposite conductivity type, located in the first region at

the surface thereof and surrounded thereby, the heavily doped third region of the opposite conductivity type being located adjacent to the aperture in the dielectric;





a first contact disposed on the diffusing layer, and;

a second contact disposed on a surface of the second region, the diffusing layer and the third, first and second regions collectively having a doping density profile substantially as exhibited in FIG. 3 for a corresponding layer A and corresponding regions B, C, and D therein, respectively.

3,990,100

SEMICONDUCTOR DEVICE HAVING AN ANTIREFLECTIVE COATING

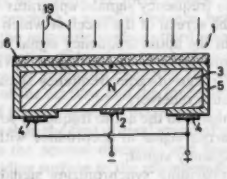
Takayoshi Mamine, Tokyo, and Takeshi Matsushita, Sagamihara, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 2, 1975, Ser. No. 619,054

Claims priority, application Japan, Oct. 9, 1974, 49-116418

Int. Cl.² H01L 27/14

U.S. Cl. 357—30 **8 Claims**



1. A photo sensitive semiconductor device comprising a semiconductor crystal substrate and an antireflective coating on said substrate, said antireflective coating including a polycrystalline silicon layer containing oxygen in an amount of from 25 to 45 atomic percent.

3,990,101

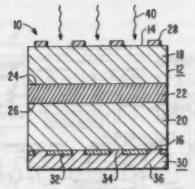
SOLAR CELL DEVICE HAVING TWO HETEROJUNCTIONS

Michael Ettenberg, Freehold, and Henry Kressel, Elizabeth, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 624,310

Int. Cl.² H01L 27/14

U.S. Cl. 357—30 **11 Claims**



1. A solar cell device comprising:

a body of semiconductor material having an incident surface a portion of which is exposed so as to allow solar radiation to enter said body, a surface opposite said incident surface, a first region of one conductivity type at said incident surface, a second region of an opposite conductivity type spaced from said first region, a third region between and contiguous to each of said first and second regions, said third region forming a P-N junction in said body, a solar radiation reflecting electrode on said opposite surface, said third region being of a material of substantially uniform composition and of a lower bandgap energy than either said first or second region so that the junctions between said third region and each of said first and second regions are heterojunctions, said first region being of a material having a bandgap energy greater than 2.1 eV thereby being substantially transparent to solar radiation, and said second region is of a material having a bandgap energy in the range of 1.5 eV to 1.9 eV.

3,990,102

SEMICONDUCTOR INTEGRATED CIRCUITS AND METHOD OF MANUFACTURING THE SAME

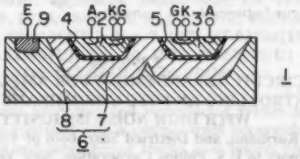
Shinzi Okuhara, Fujisawa; Ichiro Ohhinata, and Masaaki Kusano, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed June 26, 1975, Ser. No. 590,560

Claims priority, application Japan, June 28, 1974, 49-73317; July 19, 1974, 49-82184

Int. Cl.² H01L 27/12, 29/04

U.S. Cl. 357—49 **6 Claims**



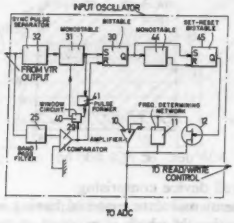
1. Semiconductor integrated circuits comprising a dielectric isolation semiconductor chip having a plurality of monocrystalline semiconductor regions in a polycrystalline semiconductor substrate electrically separated by dielectric insulation films, circuit elements being formed in the monocrystalline regions, wherein the polycrystalline substrate includes a high resistivity layer and a low resistivity layer, the high resistivity layer is adjacent to the monocrystalline regions and the low resistivity layer is coupled to a contact provided on a surface of the chip.

3,990,103

INPUT OSCILLATORS FOR TIME BASE CORRECTORS

Anthony Donald Stalley, Fleet, and John Albert Coffey, Newbury, both of England, assignors to Quantel Limited, England

Filed June 6, 1975, Ser. No. 584,544
Claims priority, application United Kingdom, June 13, 1974, 26214/74
Int. Cl.² H04N 5/76
U.S. Cl. 358—8 4 Claims



1. An input oscillator for use in a digital time base corrector controlled by an incoming video signal containing horizontal synchronising pulses and colour burst information, comprising:

a. a variable period delay device having a first input for receiving the horizontal synchronising pulse information, a control input for receiving a control signal to effect variation of said delay period, and an output for producing a pulse having a trailing edge approximately coincident in time with the centre of the filtered colour burst;

b. a select burst transition device having a first input connected to said delay device output, a second input connected to receive said filtered colour burst and to detect burst transitions thereon, and an output for producing a trigger signal after the receipt of a selected burst transition;

c. a triggered oscillator circuit controlled by means of the output from said transition device;

d. a pulse former connected to said delay device output for producing a narrow pulse at an output on receipt of the trailing edge therefrom;

e. a window circuit having a first input connected to said pulse former output, a second input connected to receive said filtered colour burst and an output connected to the control input of said variable delay device to provide control of the delay period thereof, whereby when a burst transition is detected by said window circuit coincident with a pulse from said pulse former, the control signal from said window circuit effects a change in the delay period of said delay device to cause said trailing edge to occur between burst transitions.

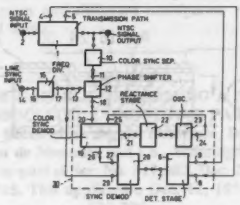
3,990,104

CIRCUIT ARRANGEMENT FOR AMPLITUDE CONTROLLING AN NTSC CHROMINANCE SIGNAL WITH HIGH NOISE IMMUNITY

Harro Kormann, and Dietfried Susz, both of Vienna, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 28, 1975, Ser. No. 562,901
Claims priority, application Austria, Apr. 10, 1974, 2995/74
Int. Cl.² H04N 9/49
U.S. Cl. 358—26 6 Claims

1. A circuit for processing a color television signal having color synchronizing and line frequency synchronizing components, said circuit comprising a phase change over stage having an input means for receiving at least the color synchronizing component of an NTSC chrominance signal, a control input, and an output; a frequency synchronizing divider having an input means for receiving said line frequency signal and an output coupled to said control input; a synchronous color synchronizing signal detector having an input coupled to said change over stage output and an output; a first detection stage coupled to said color synchronizing signal detector output;



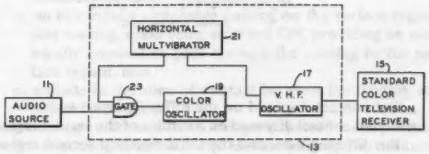
and a second detector stage coupled to said first detection stage and having an output means for providing a signal for control of the amplitude of said chrominance signal or a color killer.

3,990,105

AUDIO-VISUAL CONVERTOR

Robert E. Fast, R.R. 1, Box 59, Haviland, Ohio 45851

Filed Feb. 19, 1974, Ser. No. 443,494
Int. Cl.² H04N 9/02
U.S. Cl. 358—82 7 Claims



6. An audio-visual converter responsive to audio input signals for providing television output signals comprising:

an oscillator for providing a carrier signal in a frequency range receivable by a television receiver;

a color subcarrier oscillator circuit for providing color subcarrier signals;

means for providing horizontal synchronizing signals;

means responsive to the audio input signals for varying the phase of the color subcarrier oscillator output;

means for mixing the carrier signal, color subcarrier signals, and horizontal synchronizing signals to provide the television output signals; and

means for preventing phase variation of the color subcarrier oscillator output during the occurrence of horizontal synchronizing signals.

7. In combination with a standard television receiver and a source of audio frequency signals, apparatus for generating a display upon the screen of the receiver which display changes with changes in the audio frequency signal comprising:

means for providing a carrier signal having a frequency within the range of radio frequency signals receivable by the television receiver;

means responsive to the audio frequency source for modifying the carrier signal in accordance with changes in the audio frequency signal;

means for providing synchronizing signals to the carrier providing means;

means for coupling the modified carrier signal to a television receiver to thereby display on the receiver screen a pattern which changes as the audio frequency signal changes; and

a passive circuit coupled to the audio frequency source for providing a voltage regulated direct current source of

power from the audio frequency signals to energize the display generating apparatus.

3,990,106

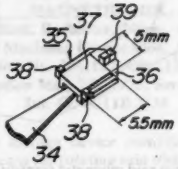
DYNAMIC NEGATIVE PRESSURE TYPE FLOATING HEAD SYSTEM

Yukio Kameyama, Hino; Hitoshi Masuko, Sagamihara; Yasuo Matsumoto, Tokyo, and Masaru Sakata, Yokohama, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo and Masaru Sakata, Yokohama, both of, Japan

Filed May 30, 1975, Ser. No. 582,447

Int. Cl.[2] G11B *5/54, 21/22, 21/20, 5/60*

U.S. Cl. 360—103 **4 Claims**



1. A floating head system for holding a magnetic head on a magnetic surface of a magnetic recording medium by means of a supporting spring in a non-contact state, comprising a supporting spring secured at one end to a fitting and free at the other end; a magnetic head secured to the free end of the spring and located opposite a magnetic surface recording of a medium to be recorded; first means formed by an inclined sliding surface of the magnetic head defining a wedge-shaped gap increasing in the direction of movement of said magnetic surface to be recorded for linearly decreasing its inclination and the relative distance between the sliding surface of the magnetic head and the magnetic surface by varying equilibrium between a negative force of an air flow and a positive force of the supporting spring making larger air pressure than the spring force during approach of the head to the magnetic medium while the relative speed between the sliding surface of the magnetic head and the magnetic surface increases from the resting state almost to a first critical speed; second means for balancing the force caused by the air flow and the force caused by the supporting spring by destroying the equilibrium between the force of the air flow and the force of the supporting spring when said relative speed reaches said first critical speed, by rapidly increasing the force caused by the air flow, thereby rapidly reaching a normal distance between the sliding surface and the magnetic surface; third means for linearly decreasing said relative distance to reach close distance to the magnetic surface by gradually changing the equilibrium between the force of the air flow and the force of the supporting spring when said relative speed is decreased to a second critical speed smaller than the first critical speed afyer said relative distance reaches the normal distance; and fourth means for retracting said sliding surface to the resting state by destroying the equilibrium between the force of the air flow and the force caused by the air flow at the second critical speed just before said relative distance becomes zero, whereby the approaching stroke to a floating position and the separating stroke from a floating state exhibit a hysteresis characteristic, automatically preventing contact between said sliding surface and the magentic surface thereby protecting both surfaces.

3,990,107

CIRCUIT FOR AUTOMATICALLY CONTROLLING HORIZONTAL SCANNING FREQUENCY

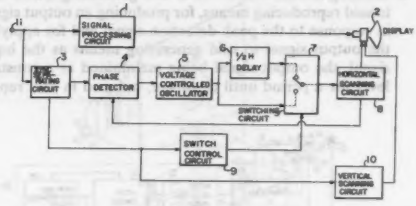
Kentaro Hanma, Yokohama; Michio Masuda, Tokyo, and Katsuo Mohri, Yokohama, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Feb. 26, 1975, Ser. No. 553,116

Claims priority, application Japan, Mar. 2, 1974, 49-24610

Int. Cl.[2] H04N *5/795*

U.S. Cl. 360—37 **4 Claims**



1. A horizontal deflecting circuit for a display device, having a horizontal scanning circuit, which displays a still picture by receiving a video signal which has been obtained by repeatedly reading out a signal stored in a memory and corresponding to a single field derived from an interlaced scanning television signal, said video signal including a horizontal sync signal having its phase shifted by 180° with every field of the video signal, comprising:

means for separating the horizontal sync signal and a vertical sync signal from the video signal;

phase detecting means for comparing the phase of the separated horizontal sync signal with the phase of flyback pulses obtained from the horizontal scanning circuit to produce a control signal in accordance with a difference between the phases;

means, controlled by the control signal, for producing two signals which are out of phase by 180° to each other, each having a frequency equal to the horizontal scanning frequency; and

means for alternately applying said two signals to the horizontal scanning circuit every field of the video signal in synchronism with the separated vertical sync signal.

3,990,108

MAGNETIC TAPE SPEED CONTROL SYSTEM

Tokuji Suga, Neyagawa, and Toshio Katagiri, Kawasaki, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 383,654, July 30, 1973, abandoned. This application July 21, 1975, Ser. No. 597,336

Claims priority, application Japan, Sept. 13, 1972, 47-92679; May 9, 1973, 48-51876; Aug. 2, 1972, 47-91365[U]; Aug. 2, 1972, 47-91364[U]; Aug. 7, 1972, 47-92906[U]; Feb. 20, 1973, 48-22369[U]; Feb. 20, 1973, 48-22370[U]

Int. Cl.[2] G11B *15/46, 19/28*

U.S. Cl. 360—73 **5 Claims**

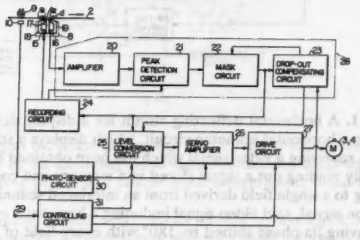
1. A magnetic recording and reproducing system using a magnetic tape provided with a control track separately from data recording and reproducing tracks, said system comprising:

a. a magnetic head including a recording magnetic circuit having a recording mangetic circuit gap and a reproducing magnetic circuit gap, said gaps being spaced from but close to each other, said magnetic head including a central core for contact with the magnetic tape and two U-shaped side cores each mounted on one side of said central core, said recording gap being formed between an end of one of said side cores and said central core, said reproducing gap being formed between an end of the other of said side cores and said central core;

b. means for generating a recording signal having a polarity which is reversed alternatively to be positive and negative each time an input signal is applied to said generating means, said generating means sending the recording signal to said recording magnetic circuit which records the recording signal on the tape;

c. means, including said reproducing magnetic circuit, for reproducing the recording signal recorded on the magnetic tape and for producing a peak detection signal each time a peak point of the reproduced signal is detected;

d. masking means, connected to said generating means and to said reproducing means, for producing an output signal in response to the peak detection signal and for applying the output signal to said generating means as the input signal, the output signal being maintained at a constant level for a period until a voltage, induced in said reproducing magnetic circuit due to leakage magnetic flux produced by said recording magnetic circuit when the current therein is reversed in response to the input signal applied to said generating means, is substantially reduced to zero;



e. means, connected to said masking means, for detecting the time interval between one output signal of said masking means and the next output signal of said masking means and for producing a tape speed signal from the detected time interval, a voltage level of the tape speed signal being dependent on the speed of the tape; and

f. means, connected to said detecting means, for driving the magnetic tape, said driving means including a supply reel and a take-up reel respectively coupled directly to drive shafts of drive motors, the speed of the magnetic tape being maintained at a predetermined level by controlling said drive motors in accordance with tape speed signal.

3,990,109

MULTIPLE FLEXIBLE RECORD STORAGE DISK APPARATUS HAVING AN ACCESS ARM WITH ENHANCED DISK STABILIZING FEATURES

Hans-Gordon Seifert, Weil im Schoenbuch, Germany, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 16, 1975, Ser. No. 587,462

Claims priority, application Germany, Dec. 21, 1974, 2460249

Int. Cl.² G11B 5/82, 25/04, 5/54

U.S. Cl. 360—99 **9 Claims**

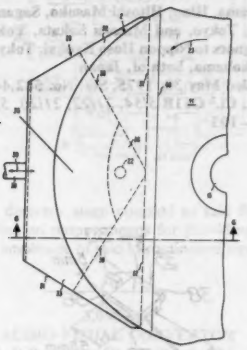
1. An access arm carrying a magnetic transducer for use in a magnetic disk storage apparatus having a coaxial stack of flexible magnetic storage disks, means for selectively inserting said access arm into the stack of disks for accessing a first record surface of a first one of said storage disks, means supplying radially outwardly flowing air to stabilize said disks during rotation;

the improvement including in combination:

first and second disk confining elements in said access arm joined at an acute angular apex at a radial inwardmost portion of said access arm to be positioned in said stack of disks, each element having a disk facing surface for confining same to a predetermined position in said stack;

said transducer extending through a first of said confining elements;

said first confining element having means for diverting air in a predetermined circumferential position with respect to said magnetic transducer to divert a predetermined portion of air from said magnetic transducer whereby said first record surface is disposed at a first predetermined distance from said transducer; and



spacing of adjacent ones of said record storage disks from said first and second confining element surfaces remote from said transducer being at a different spacing than said first-mentioned predetermined spacing.

3,990,110

TAPE GUIDING DEVICE FOR A MAGNETIC INSTRUMENT

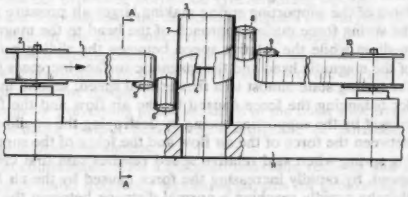
Peter Gunschmann, Darmstadt, Germany, assignor to Robert Bosch Fernsehanlagen G.m.b.H., Darmstadt, Germany

Filed Aug. 14, 1975, Ser. No. 604,626

Claims priority, application Germany, Aug. 30, 1974, 2441663

Int. Cl.² G11B 5/52, 21/04, 15/60

U.S. Cl. 360—84 **2 Claims**



1. A magnetic tape guiding device for use in a magnetic tape instrument having a magnetic tape, a supply reel having an axis for supplying said magnetic tape, a drum arrangement including a rotary magnetic head arrangement disposed in a drum having an axis and having a transverse division for the recording and playback of said magnetic tape, and a take-up reel having an axis for receiving said magnetic tape; said magnetic tape having a path extending from said supply reel to said drum where it follows a helical path along the circumference of said drum for about 180°, and then to said take-up reel, the axes of said reels and said drum being substantially parallel to each other; said device comprising:

first and second cylindrical vertical level equalizing elements disposed in the path of said magnetic tape, on

opposite sides of said drum, said elements being axially askewed with respect to said drum, oppositely offset with respect to the division in said drum and each being disposed tangent to a plane tangent to said drum, the path of said magnetic tape having a portion extending along the circumference of each element for about 180°, said reels being disposed at substantially the same level and substantially at the same level as said division; and

first and second cylindrical re-orientation elements disposed in the path of said magnetic tape, said first re-orientation element being disposed between said supply reel and said first equalizing element and tangent to a plane tangent to said first equalizing element, said second re-orientation element being disposed between said take-up reel and said second equalizing element and tangent to a plane tangent to said second equalizing element.

3,990,111

DATA STORAGE APPARATUS EMPLOYING A FLEXIBLE MAGNETIC DISK

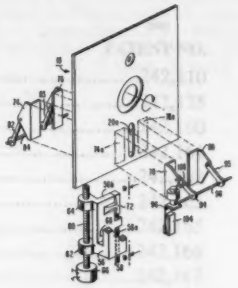
James Francis Elliott, Rochester, Minn., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 406,137, Oct. 12, 1973, abandoned. This application Mar. 10, 1975, Ser. No. 556,859

Int. Cl.² G11B *5/16*

U.S. Cl. 360—99 **3 Claims**

1. A magnetic storage device comprising a thin flexible magnetic disk, means for rotating said disk, a pair of magnetic heads located opposite each other and at opposite faces of said disk, means for holding said magnetic heads against movement in directions normal to said disk, a first pair of pressure pads fixed together and located at one face of said disk on opposite sides of and spaced from said head at that side of the disk, a second pair of pressure pads fixed together and located at the other face of said disk and on opposite sides of and spaced from said head at that side of the disk and located directly opposite and in register with said first pair of pressure pads respectively, motor means for moving each of said pairs of pads as a unit forwardly toward said magnetic head located at the opposite face of said disk, and means for yieldably mounting each of said pairs of pads so that each of said pairs of pads may yield and move backwardly under the force exerted by the opposite pair of said pads in moving forwardly so that said opposite pair of pads may force the disk onto and around said magnetic head on the same side of said disk as the backwardly moving pads for a firm data transferring contact on said disk with this magnetic head, said means



for yieldably mounting each of said pairs of pads including a spring means which allows this pair of pads to move backwardly and which resists the action of the motor means for this pair of pads in moving this pair of pads forwardly, said spring means for each pair of pads being constructed so that it has a relatively high spring rate for resisting the action of the motor means for this pair of pads in moving this pair of pads forwardly and a relatively low spring rate for movement of this pair of pads backwardly.

DESIGN PATENTS

GRANTED OCTOBER 2, 1976

ERRATA

For CLASS	See PATENT NO.
015–062	242,110
025–074	242,138
011–155	242,160
011–152	242,161
015–032	242,162
011–082	242,163
015–056	242,165
015–056	242,166
015–127	242,167
015–028	242,168
016–023	242,170
015–112	242,184

DESIGN PATENTS

GRANTED OCTOBER 2, 1956

ERRATA

CLASS	PATENT NO.
015-052	242,110
025-074	242,138
011-155	242,160
011-152	242,161
015-052	242,162
011-082	242,163
015-056	242,165
015-056	242,166
015-127	242,167
015-028	242,168
016-023	242,170
015-112	242,184

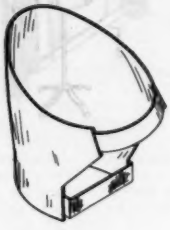
DESIGNS

NOVEMBER 2, 1976

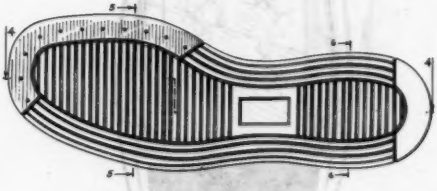
242,088
HELMET
Philip E. Durand, Hudson, Lawrence R. McManus, Lynn, and William D. Claus, Jr., Natick, Mass., assignors to the United States of America as represented by the Secretary of the Army
Filed Aug. 22, 1975, Ser. No. 606,815
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—232

242,089
SHOE
Daniel Raufast, Savigny-sur-Orge, France, assignor to Raufast & Fils, Savigny-sur-Orge, Essonne, France
Filed May 12, 1975, Ser. No. 576,267
Claims priority, application France Nov. 13, 1974
Term of patent 7 years
Int. Cl. D2—*04*
U.S. Cl. D2—272

242,090
SCUFF PREVENTING HEEL COVER
William W. Wilson, 1066 W. 102nd Ave., Northglenn, Colo. 80221
Filed Mar. 17, 1975, Ser. No. 558,943
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—277

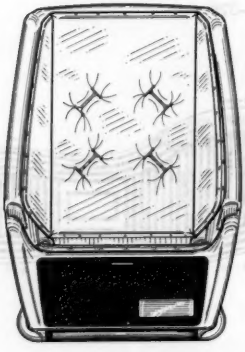


242,091
SOLE FOR FOOTWEAR
Roger Tornero, Naugatuck, Conn., assignor to Uniroyal, Inc., New York, N.Y.
Filed May 9, 1975, Ser. No. 575,876
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D2—320



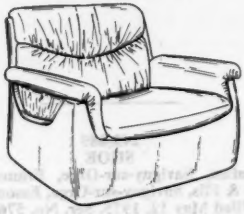
242,092
DRESSMAKER'S FORM
David Levin, 380 Throop Ave., Brooklyn, N.Y. 11221
Filed Dec. 16, 1974, Ser. No. 532,899
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D3—19 A

242,093
CHILD'S CAR SEAT
Richard E. Cone II, 249 Bowman Drive, Kent, Ohio 44240, and Leo F. Wildgen, 9431 10th Ave. S., Minneapolis, Minn. 55420
Filed July 14, 1975, Ser. No. 595,696
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—9



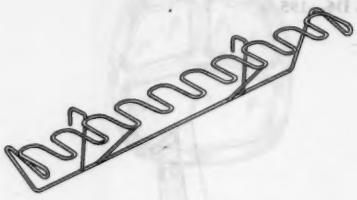
242,094
STOOL
Jose A. Lopez, Miami, Fla., assignor to Camilo Muebles, Inc.
Filed June 13, 1975, Ser. No. 586,717
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—36

242,095
ARMCHAIR
Robert Tillberg, P.O. Box 79, S–260 40 Viken, Sweden
Filed Nov. 6, 1974, Ser. No. 521,378
Claims priority, application Sweden May 7, 1974
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—37

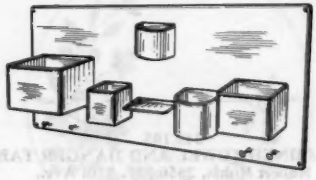


242,096
WALL MOUNTED RACK FOR KEYS
Jürgen G. Hess, Neuer Weg 2, 7734 Brigachtal-Klengen, Germany
Filed Oct. 2, 1975, Ser. No. 619,035
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—114

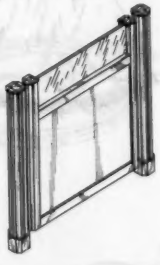
242,097
RACK FOR BASEBALL BATS OR THE LIKE
Leslie L. O'Neal, 3132 Via Arcilla,
San Diego, Calif. 92111
Filed Mar. 24, 1975, Ser. No. 561,170
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—125



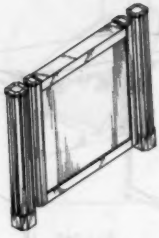
242,098
WALL MOUNTED SUPPORT FOR BABY NURSERY ACCESSORIES OR THE LIKE
Stuart S. Leopold, 600 Shore Road,
Long Beach, N.Y. 11561
Filed Feb. 7, 1975, Ser. No. 547,989
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—131



242,099
ROOM PARTITION OR SIMILAR ARTICLE
Neil W. Casey, Cupertino, Calif., assignor to The Jack Dymond Company, Mountain View, Calif.
Filed Aug. 13, 1975, Ser. No. 604,460
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—139

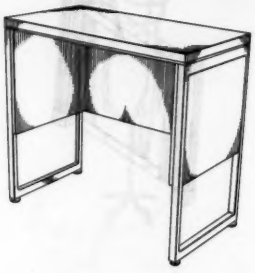


242,100
ROOM PARTITION OR SIMILAR ARTICLE
Neil W. Casey, Cupertino, Calif., assignor to The Jack Dymond Company, Mountain View, Calif.
Filed Aug. 13, 1975, Ser. No. 604,461
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—139

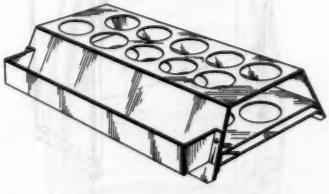


242,101
FILE UNIT OR SIMILAR ARTICLE
Loren D. Stirling, Pleasanton, Calif., assignor to Xerox Corporation, Stamford, Conn.
Filed Dec. 3, 1973, Ser. No. 420,831
Term of patent 14 years
The term of this patent subsequent to Sept. 16, 1989, has been disclaimed
Int. Cl. D6—*04*
U.S. Cl. D6—167

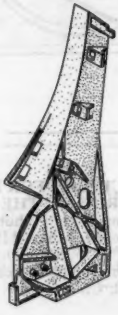
242,102
TABLE OR SIMILAR ARTICLE
Loren D. Stirling, Pleasanton, Calif., assignor to Xerox Corporation, Stamford, Conn.
Filed Dec. 3, 1973, Ser. No. 420,828
Term of patent 14 years
The term of this patent subsequent to Sept. 16, 1989, has been disclaimed
Int. Cl. D6—*03*
U.S. Cl. D6—177



242,103
COMBINED BAT AND BALL RACK OR SIMILAR ARTICLE
Duane A. Schultz, Minnetonka, Minn., and William F. Badenhoff, 5024 14th Ave. S., Minneapolis, Minn. 55417; said Shultz assignor to said Badenhoff
Filed May 12, 1975, Ser. No. 576,810
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—188



242,104
FURNITURE SUBFRAME
Charles P. Bohan, Wilmington, William R. Curtis, New Castle, and David C. Trimble, Yorklyn, Del., assignors to Hercules Incorporated, Wilmington, Del.
Original design application Nov. 11, 1974, Ser. No. 522,970. Divided and this application Dec. 31, 1975, Ser. No. 645,842
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—195

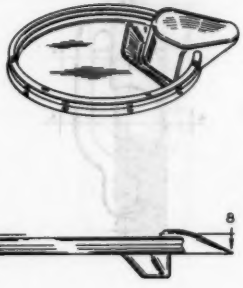


242,105
COMBINED TOWEL AND HANGER TAB
Robert Rohrs, 2650 SW. 87th Ave., Fort Lauderdale, Fla. 33394
Filed June 23, 1975, Ser. No. 589,419
Term of patent 14 years
Int. Cl. D6—*13*
U.S. Cl. D6—265

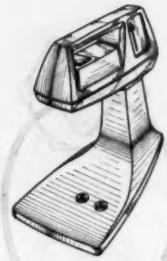
242,106
COMPARTMENTED PLATE
Ali R. Caner, Batavia, Ill., assignor to American Can Company
Filed Oct. 1, 1974, Ser. No. 511,399
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—1

242,107
PLATE OR SIMILAR ARTICLE
Seiichi Makita, Nagoya, Japan, assignor to Noritake Co., Limited (Nippon Toki Kabushiki Kaisha), Nagoya, Japan
Filed Apr. 25, 1975, Ser. No. 571,819
Claims priority, application Japan Nov. 6, 1974
Term of patent 7 years
Int. Cl. D7—*01*
U.S. Cl. D7—23

242,108
COVER FOR A BEVERAGE CUP OR THE LIKE
William A. Dart, Mason, Mich., assignor to Dart Container Corporation, Mason, Mich.
Filed Mar. 31, 1975, Ser. No. 563,564
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—40



242,109
COMBINED FOOD MIXER AND STAND
Artur Fernandes da Silva, Jr., Sao Paulo, Brazil, assignor to Walita S.A. Electro Industria, Sao Paulo, Brazil
Filed Jan. 8, 1975, Ser. No. 539,460
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—159

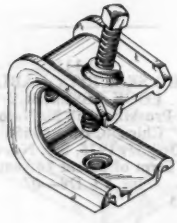


242,110
PARTICLE SEPARATOR FOR A VACUUM CLEANER
Bjorn Snapa, Enebakkvn. 230 B. Oslo 11, Norway
Filed May 27, 1975, Ser. No. 581,120
Claims priority, application Norway Nov. 25, 1974
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—62

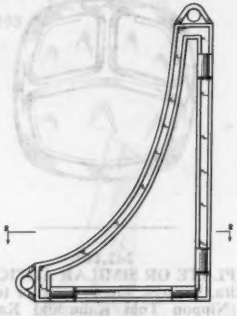
242,111
COATED SECURITY CABLE AND LOCK ASSEMBLY
Basil D. Proskin, 4858 N. Natoma Ave., Chicago, Ill. 60656
Filed Oct. 31, 1975, Ser. No. 627,708
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—113

242,112
CABLE LOCK
Paul F. Sander, Wantagh, N.Y., assignor to I. O. Prague Corporation, Plainview, N.Y.
Filed Mar. 27, 1974, Ser. No. 455,057
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—114

242,113
BEAM CLAMP
Thomas C. Mooney, Mount Sinai, Padej Gajajiva, Elmhurst, and Sami Shemtov, Brooklyn, N.Y., assignors to I-T-E Imperial Corporation, Efcor Division, East Farmingdale, N.Y.
Filed May 7, 1975, Ser. No. 575,406
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—235

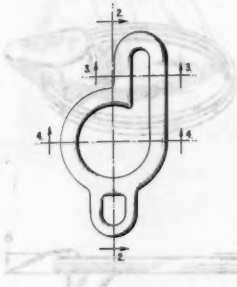


242,114
STANCHION FOR A CAR-TOP BOAT RACK
Richard H. Lange, 1339 Rowe Road, Schenectady, N.Y. 12309
Filed May 29, 1975, Ser. No. 581,976
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—242



242,115
WALL HANGER
Carl-Arne Breger, Torup, Sweden, assignor to Barebo AB, Torup, Sweden
Filed Sept. 22, 1975, Ser. No. 615,400
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—257

242,116
CHAIN GRAB LINK OR SIMILAR ARTICLE
Gerald R. Mooney, 3080 Eldogor Lane 16105, and Louis A. Mooney, 1002 Ryan Ave. 16101, both of New Castle, Pa.
Filed Sept. 18, 1975, Ser. No. 614,527
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—261

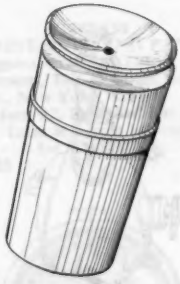


242,117
BOLT
Toru Ono, Izumi-shi, Osaka-fu, Japan, assignor to Kabushiki Kaisha Izumi Seisakusho, Osaka, Japan
Filed Oct. 7, 1975, Ser. No. 620,335
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—264

242,118
BOLT
Toru Ono, Izumi-shi, Osaka-fu, Japan, assignor to Kabushiki Kaisha Izumi Seisakusho, Osaka, Japan
Filed Oct. 7, 1975, Ser. No. 620,336
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—267

242,119
NUT
Toru Ono, Izumi-shi, Osaka-fu, Japan, assignor to Kabushiki Kaisha Izumi Seisakusho, Osaka, Japan
Filed Oct. 7, 1975, Ser. No. 620,333
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—273

242,120
COMBINED PRESSURIZED CONTAINER AND ACTUATOR
Arthur Z. Berenstein, 212 W. 41st St., Erie, Pa. 16508
Continuation-in-part of abandoned design application Ser. No. 227,012, Feb. 16, 1972. This application May 16, 1974, Ser. No. 470,544
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—9



242,121
BOTTLE OR SIMILAR ARTICLE
Barry J. Stoddard, 129 Jackson St., South River, N.J. 08882
Continuation-in-part of abandonded design application Ser. No. 376,352, July 5, 1973. This application May 1, 1975, Ser. No. 573,442
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—32

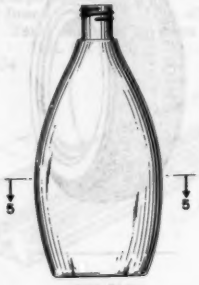
242,122
BOTTLE OR SIMILAR ARTICLE
Barry J. Stoddard, 129 Jackson St., South River, N.J. 08882
Continuation-in-part of abandonded design application Ser. No. 376,352, July 5, 1973. This application May 1, 1975, Ser. No. 573,443
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—32

242,123
BOTTLE OR SIMILAR ARTICLE
Barry J. Stoddard, 129 Jackson St., South River, N.J. 08882
Continuation-in-part of abandonded design application Ser. No. 376,352, July 5, 1973. This application May 1, 1975, Ser. No. 573,444
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—33

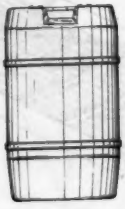
242,124
BOTTLE OR SIMILAR ARTICLE
Barry J. Stoddard, 129 Jackson St., South River, N.J. 08882
Continuation-in-part of abandonded design application Ser. No. 376,352, July 5, 1973. This application May 1, 1975, Ser. No. 573,635
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—33

242,125
BOTTLE
Juan Enrique Barcelo de Torres, Calle Francisco Silvela 21, Madrid, Spain
Original design application Apr. 17, 1974, Ser. No. 461,715. Divided and this application June 12, 1975, Ser. No. 586,401
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—68

242,126
BOTTLE OR SIMILAR ARTICLE
Maurice K. Morea, Kansas City, Mo., assignor to Ethyl Development Corporation, Kansas City, Mo.
Filed Mar. 12, 1975, Ser. No. 557,751
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—143



242,127
PLASTIC DRUM
Richard L. Bonnett, Eldora, Iowa, assignor to Quality Products, Inc., Eldora, Iowa
Filed Apr. 8, 1974, Ser. No. 459,062
Term of patent 14 years
Int. Cl. D9—*02*
U.S. Cl. D9—170



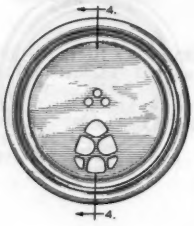
242,128
TOP OF A DRUM
Edward J. Chase, 1215 Stinsford Road, and William R. Topper, 210 Aronimink Drive, both of Newark, Del. 19711
Filed Sept. 10, 1974, Ser. No. 504,691
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—253

242,129
CONTAINER END PANEL
Gary K. Hasegawa, Morton Grove, and Carmen T. Mascia, Westmont, Ill., assignors to Continental Can Company, Inc., New York, N.Y.
Filed June 12, 1975, Ser. No. 586,489
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—253

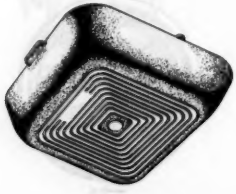
242,130
CONTAINER END PANEL
Gary K. Hasegawa, Morton Grove, and Carmen T. Mascia, Westmont, Ill., assignors to Continental Can Company, Inc., New York, N.Y.
Filed June 12, 1975, Ser. No. 586,487
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—253

242,131
CONTAINER END PANEL
Gary K. Hasegawa, Morton Grove, and Carmen T. Mascia, Westmont, Ill., assignors to Continental Can Company, Inc., New York, N.Y.
Filed June 12, 1975, Ser. No. 586,488
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—253

242,132
CONTAINER END PANEL
Gary K. Hasegawa, Morton Grove, and Carmen T. Mascia, Westmont, Ill., assignors to Continental Can Company, Inc., New York, N.Y.
Filed June 12, 1975, Ser. No. 586,486
Term of patent 14 years
Int. Cl. D9—*99*
U.S. Cl. D9—253



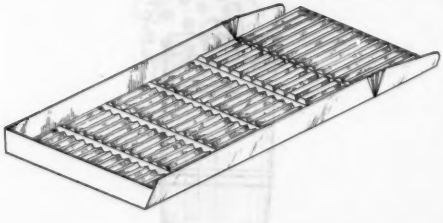
242,133
SMOKE ALARM OR SIMILAR ARTICLE
George Henry Fitzsimonds, Bridgeport, Conn., assignor to General Electric Company
Filed Nov. 10, 1975, Ser. No. 630,205
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106



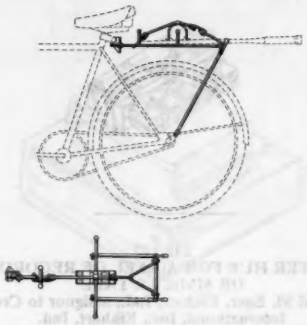
242,134
SAILBOAT HULL
Paul F. Humpley, 1218 Wilcox, Joliet, Ill. 60435
Continuation-in-part of abandonded design application Ser. No. 407,229, Oct. 17, 1973. This application Oct. 3, 1975, Ser. No. 619,520
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—64

242,135
TIRE
Brian Howard Holmes and Clive Flint, West Midlands, England, assignors to Dunlop Limited, London, England
Filed July 1, 1975, Ser. No. 592,240
Claims priority, application Great Britain Feb. 14, 1975
Term of patent 14 years
The term of this patent subsequent to June 24, 1989, has been disclaimed
Int. Cl. D12—*15*
U.S. Cl. D12—143

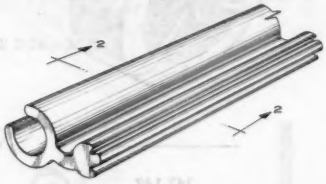
242,136
CAR FLOOR TRAY
William Matlock, 10565 44th St., Edmonton, Alberta, Canada
Filed Jan. 2, 1974, Ser. No. 429,584
Claims priority, application Canada July 5, 1973
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155



242,137
BICYCLE MOUNTABLE RACK FOR TENNIS EQUIPMENT OR THE LIKE
Thomas F. O'Connor, Fairway, Kans., assignor to Acme Products Co., Inc., Kansas City, Mo.
Filed Oct. 31, 1975, Ser. No. 627,709
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—158

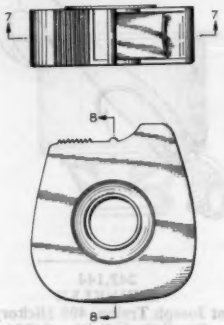


242,138
PILING FOR THE CONSTRUCTION OF RETAINING WALLS OR THE LIKE
Ronald H. Drawsky, Walnut Creek, and David C. Thomas, Moraga, Calif., assignors to Kaiser Aluminum & Chemical Corporation
Filed June 11, 1974, Ser. No. 478,192
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—74



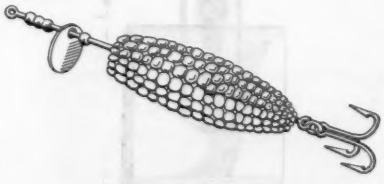
242,139
DATA DISPLAY INDICATOR FOR AN ATHLETIC EVENT OR THE LIKE
Lloyd S. Turner, Los Gatos, Calif., assignor to Hind-Wells, Inc., San Luis Obispo, Calif.
Filed Jan. 9, 1975, Ser. No. 539,719
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—26

242,140
TAPE DISPENSER
Seiichi Okutani, Suita, Japan, assignor to Nitto Electric Industrial Co., Ltd., Ibaraki, Japan
Filed Oct. 16, 1973, Ser. No. 406,852
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—69



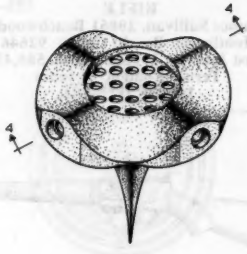
242,141
RIFLE
Leroy James Sullivan, 20861 Beachwood Lane, Huntington Beach, Calif. 92646
Filed June 19, 1975, Ser. No. 588,458
Term of patent 14 years
Int. Cl. D22—*01*
U.S. Cl. D22—6

242,142
FISHING LURE
Laura E. Newton, 615 Orient Ave., Cincinnati, Ohio 45232
Filed Aug. 4, 1975, Ser. No. 601,365
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

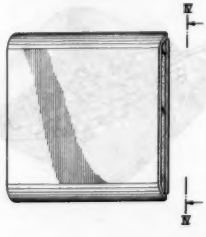


242,143
FISHING LURE
Kester M. Roberts, Norfolk, Va., assignor to Hopkins Fishing Lures Co., Inc., Norfolk, Va.
Filed July 7, 1975, Ser. No. 593,901
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

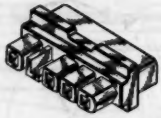
242,144
SPRINKLER
Vincent Joseph Traina, 400 Hickory Lane, San Rafael, Calif. 94901
Filed Dec. 15, 1975, Ser. No. 641,088
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—7



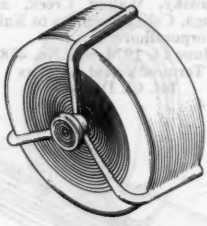
242,145
COMBINED HOLDER AND MOUNTING BRACKET FOR SOLID DEODORANT, PERFUME, INSECT REPELLANT OR THE LIKE
Georg Schimanski, Hagen, Germany, assignor to Global Werk GmbH
Filed Oct. 15, 1975, Ser. No. 622,630
Claims priority, application Germany Apr. 21, 1975
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150



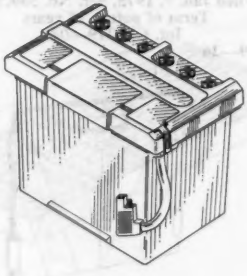
242,146
MODULAR CONNECTOR HOUSING
Wilmer Lee Sheesley, Harrisburg, and Dean Roosevelt Hooper, Jr., Middletown, Pa., assignors to AMP Incorporated, Harrisburg, Pa.
Filed Feb. 6, 1976, Ser. No. 655,817
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A



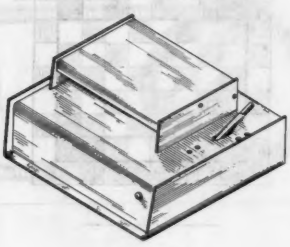
242,147
ADAPTER HUB FOR A REEL OF RECORDING OR SIMILAR TAPE
Donald M. Eger, Elkhart, Ind., assignor to Crown International, Inc., Elkhart, Ind.
Filed Jan. 2, 1975, Ser. No. 538,031
Term of patent 14 years
Int. Cl. D14—*99*
U.S. Cl. D26—1 R



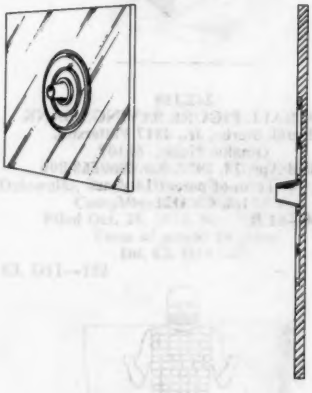
242,148
BATTERY
Robert C. Slautterback, Toledo, Ohio, assignor to Eltra Corporation, Toledo, Ohio
Filed June 12, 1975, Ser. No. 586,440
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D26—4



242,149
PLASTIC TAPE SPLICE LOCATING DEVICE
Forest S. Tibbetts, 2612 Key Largo Lane, Fort Lauderdale, Fla. 33312
Filed Nov. 18, 1974, Ser. No. 524,415
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 B



242,150
COMBINED LOUD SPEAKER AND SOUND TRANSMITTING PANEL OR SIMILAR ARTICLE
John R. Pearson, Melrose, Mass., assignor to Floyd S. Poe, Linden, N.J., and John R. Pearson, Melrose, Mass., fractional part interest to each
Filed July 22, 1974, Ser. No. 490,379
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 G

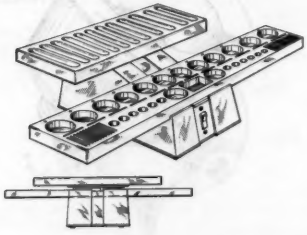


242,151
CEILING SPEAKER
Ronald C. Wellward, 35 Huntington Road, Garden City, N.Y. 11530, and Sherry Neuman, 72 Yale St., Roslyn Heights, N.Y. 11576
Filed Sept. 4, 1975, Ser. No. 610,126
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 G

242,152
CIGARETTE LIGHTER
Kenjiro Goto, Tokyo, Japan, assignor to Masei Kogyo Kabushiki Kaisha, Kawaguchi, Saitama, Japan
Filed Mar. 24, 1975, Ser. No. 561,609
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—36

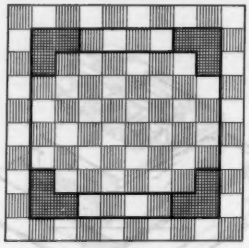
242,153
BURIAL CASKET
Hugh Acton, Kalamazoo, Mich., assignor to Boyertown Burial Casket Company, Boyertown, Pa.
Filed Apr. 3, 1975, Ser. No. 564,746
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D31—1

242,154
BLOOD MIXER
Manuel Goy, 1215 S. Cloverdale Ave., Los Angeles, Calif. 90019
Filed Mar. 10, 1976, Ser. No. 665,612
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D32—2 C

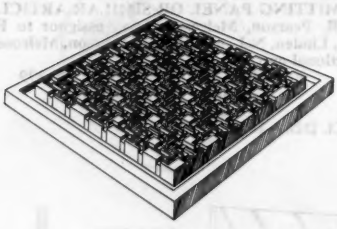


242,155
DOLL
Jo Ann Harper, 7325 High Drive, and Patricia P. Johnson, 2221 Drury Lane, both of Shawnee Mission, Kans. 66208
Filed Apr. 30, 1975, Ser. No. 573,048
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—4 R

242,156
GAME BOARD
John Hovnanian, Arlington, Mass. (25 Cobb St., Medford, Mass. 02155)
Filed Jan. 22, 1975, Ser. No. 542,911
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

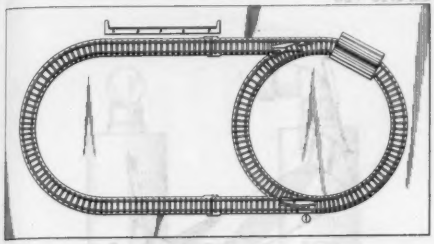


242,157
GAME BOARD
John A. Missinich, 72 5th Ave., Pointe Claire, Quebec, Canada
Filed Oct. 2, 1974, Ser. No. 511,484
Claims priority, application Canada Apr. 2, 1974
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS

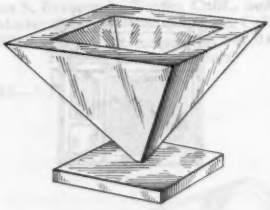


242,158
FOOTBALL FIGURE SAVINGS BANK
Frank Sterba, Jr., 4317 Patterson, Omaha, Nebr. 68107
Filed Apr. 14, 1975, Ser. No. 568,006
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—11 R

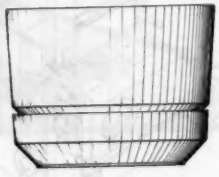
242,159
TOY TRACKWAY FOR TRAIN
Yukio Sugihara, Tokyo, Japan, assignor to Toytown Corporation, Tokyo, Japan
Filed May 27, 1975, Ser. No. 580,742
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 MM



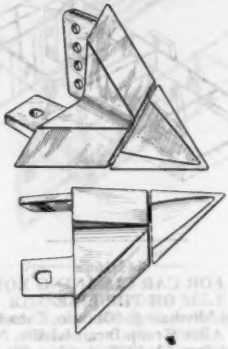
242,160
PLANTER
Richard W. Ruark, 122 Sobieski St. 16507, and Frank W. Saunders, 4698 W. Lake Road 16505, both of Erie, Pa.
Filed Nov. 28, 1975, Ser. No. 635,581
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—155



242,161
FLOWER POT OR THE LIKE
Ted Dziewulki, Bartlett, Ill., assignor to Philips Petroleum Company, Bartlesville, Okla.
Filed Oct. 28, 1975, Ser. No. 625,809
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—152

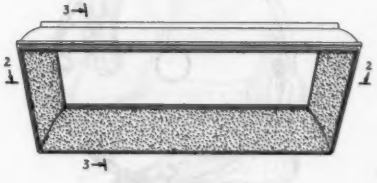


242,162
CORNER SHAPED TOOTH FOR DIGGING AND EXCAVATING BUCKETS
Sten Johan Dahlberg, Karlskoga, Sweden, assignor to AB Bofors, Bofors, Sweden
Filed Jan. 3, 1975, Ser. No. 538,278
Claims priority, application Sweden July 5, 1974
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D15—32

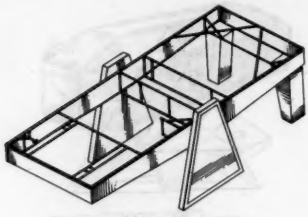


242,163
PENDANT
Judith Mitchell Horowitz, 3359 Ocean Ave., Oceanside, N.Y. 11572
Filed May 28, 1975, Ser. No. 581,628
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—82

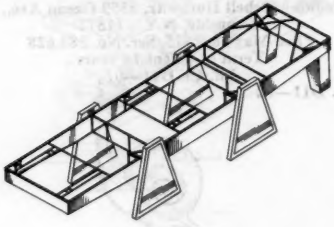
242,164
FRAMING MODULE FOR LIGHTING FOR CEILINGS OR SIMILAR ARTICLE
Stuart H. Manley, White Bear Lake, Minn., and William H. P. Tacke, Wyoming, Mich., assignors to Conwed Corporation, St. Paul, Minn.
Continuation of abandoned design applications Ser. Nos. 386,072 and 386,073, Aug. 6, 1973. This application Apr. 28, 1975, Ser. No. 572,125
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—7 D



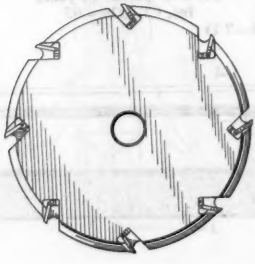
242,165
SUPPORT FOR CAR CLEANING EQUIPMENT OR THE LIKE
Ivan J. Barber, Mississauga, Ontario, Canada, assignor to The Allen Group Inc., Melville, N.Y.
Filed June 12, 1975, Ser. No. 586,293
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—56



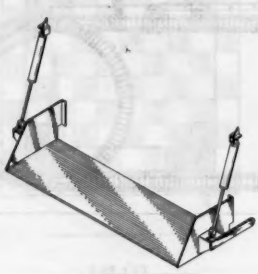
242,166
SUPPORT FOR CAR CLEANING EQUIPMENT OR THE LIKE
Ivan J. Barber, Mississauga, Ontario, Canada, assignor to The Allen Group Inc., Melville, N.Y.
Filed June 12, 1975, Ser. No. 586,294
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—56



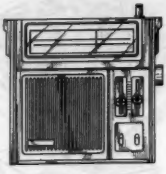
242,167
DEVICE FOR CUTTING TREAD RUBBER FROM VEHICLE TIRES
James W. Heaton, Greensburg, and William E. Fawcett, Latrobe, Pa., assignors to Kennametal Inc., Latrobe, Pa.
Filed June 26, 1974, Ser. No. 483,102
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—127



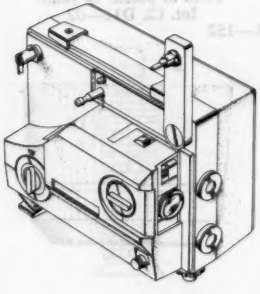
242,168
AIR-OPERATED DUMPER ADJUNCT FOR TOBACCO FEEDER
Edwin L. Wilding, Louisville, Ky., assignor to Griffin & Company, Louisville, Ky.
Continuation-in-part of design application Ser. No. 551,975, Feb. 21, 1975. This application Sept. 12, 1975, Ser. No. 612,929
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—28



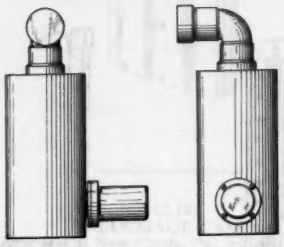
242,169
RADIO
Kunio Takei, North Point, Hong Kong, assignor to Nissei Sangyo Co., Ltd., Tokyo, Japan
Filed May 30, 1974, Ser. No. 474,410
Claims priority, application Great Britain Mar. 21, 1974
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B



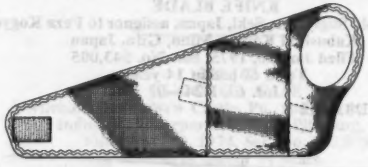
242,170
MOVIE PROJECTOR
Takaharu Kato, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh
Filed July 5, 1974, Ser. No. 486,055
Term of patent 7 years
Int. Cl. D16—*04*
U.S. Cl. D16—23

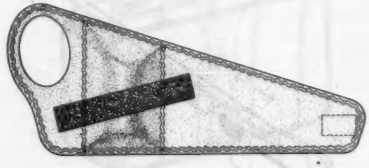


242,171
X-RAY TUBE
Harald F. H. Warrikhoff, Keplerstrasse 8–10, D 1000, Berlin 10, Germany
Filed Dec. 9, 1974, Ser. No. 531,094
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 H

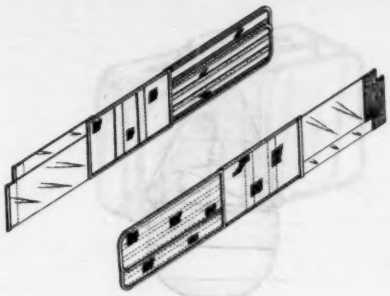


242,172
WRIST SUPPORT
Norman S. Borenstein, Tustin, Calif., assignor to Masters Industries, Inc., Irvine, Calif.
Filed Feb. 11, 1974, Ser. No. 441,018
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 J

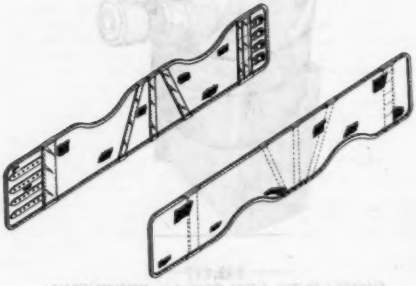




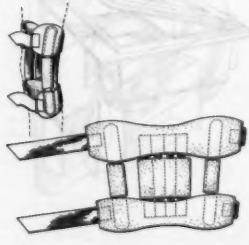
242,173
KIDNEY SUPPORT BELT
Connie Evans, 300 S. Cypress Ave., Alhambra, Calif. 91801
Filed Jan. 20, 1975, Ser. No. 542,469
Term of patent 14 years
Int. Cl. D2—*02;* D24—*04*
U.S. Cl. D83—1 J



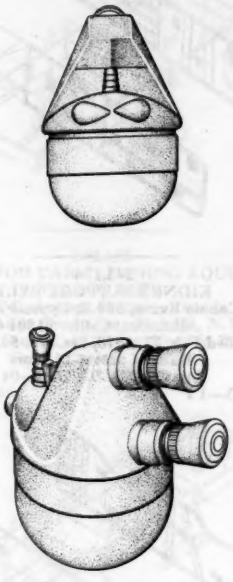
242,174
KIDNEY SUPPORT BELT
Connie Evans, 300 S. Cypress Ave., Alhambra, Calif. 91801
Filed Feb. 27, 1975, Ser. No. 542,468
Term of patent 14 years
Int. Cl. D2—*02;* D24—*04*
U.S. Cl. D83—1 J



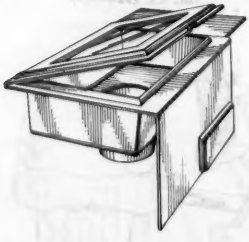
242,175
ORTHOPEDIC KNEE BRACE
Irving Spiro, 75 NE. 214th St., Miami, Fla. 33162
Filed July 9, 1975, Ser. No. 594,605
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 J



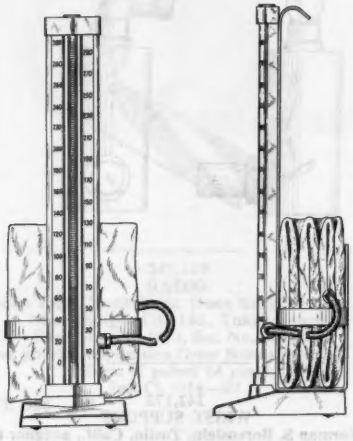
242,176
RESERVOIR FOR ULTRASONIC INHALATION THERAPY
Walter Levine, Lincolnwood, Ill., assignor to Inhalation Therapy Equipment, Inc., Chicago, Ill.
Filed Aug. 25, 1975, Ser. No. 607,118
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 N



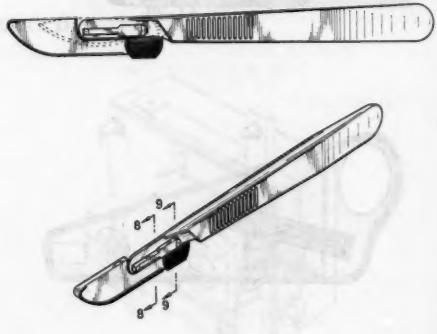
242,177
CONTAINER FOR ORGAN PERFUSION
John P. Hall, South Pasadena, Calif., assignor to American Hospital Supply Corporation
Filed Aug. 23, 1974, Ser. No. 500,128
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D83—1 N



242,178
SPHYGMOMANOMETER
Mario Saenz-Arroyo, Mexico City, Mexico, assignor to Articulos Medicos Mexicanos, S.A.
Filed Feb. 9, 1976, Ser. No. 656,678
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R

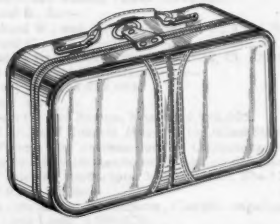


242,179
DISPOSABLE HOLDER FOR SURGICAL KNIFE BLADE
Tsuneyoshi Sugiyama, Seki, Japan, assignor to Feza Kogyo Kabushiki Kaisha, Mino, Gifu, Japan
Filed Jan. 20, 1975, Ser. No. 543,005
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 R

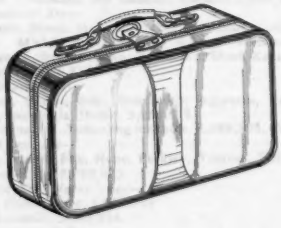


242,180
CARRYING CASE FOR CIRCULAR SAW BLADES OR THE LIKE
Robert A. Bailey, 2339 E. 12th St., Des Moines, Iowa 50316
Filed Dec. 16, 1974, Ser. No. 533,456
Term of patent 14 years
Int. Cl. D3—*99*
U.S. Cl. D87—1 R

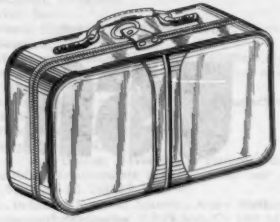
242,181
LUGGAGE CASE
Michael Davis, New Castle, Pa., assignor to Airway Industries Incorporated, West Pittsburg, Pa.
Filed Nov. 19, 1974, Ser. No. 525,087
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 G



242,182
LUGGAGE CASE
Michael Davis, New Castle, Pa., assignor to Airway Industries Incorporated, West Pittsburg, Pa.
Filed Nov. 19, 1974, Ser. No. 525,079
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 G

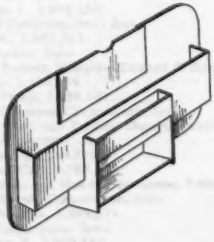


242,183
LUGGAGE CASE
Michael Davis, New Castle, Pa., assignor to Airway Industries Incorporated, West Pittsburg, Pa.
Filed Nov. 19, 1974, Ser. No. 525,078
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 G



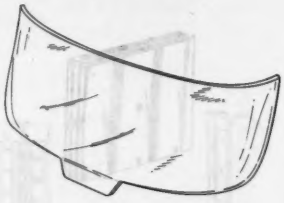
242,184
PORTABLE BEVERAGE DISPENSER
Thomas M. McTigue, St. Matthews, Ky. (3505 Hillsboro Court, Louisville, Ky. 40207)
Filed Jan. 7, 1975, Ser. No. 539,085
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—112

242,185
CHARACTER DISPLAY
William John Benmore, London, England, assignor to Basaratta (M.A.D.E.) Limited, London, England
Filed Mar. 25, 1975, Ser. No. 561,773
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D96—2



242,186
INVERTIBLE SIGN
Elmer E. S. Lengyel, 4655 Wild Indigo #231, Houston, Tex. 77027
Filed Sept. 7, 1973, Ser. No. 372,191
Term of patent 14 years
Int. Cl. D11—*03;* D18—*03;* D20—*03*
U.S. Cl. D96—12 E

242,187
DESK NAMEPLATE OR SIMILAR ARTICLE
J. Wilson Goss, 410 South St. SW., Warren, Ohio 97053
Filed Apr. 9, 1975, Ser. No. 566,378
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 F



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 2ND DAY OF NOVEMBER, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A & E Plastik Pak Co., Inc.: *See—*
Crane, Walton B., 3,989,140.

AB Bofors: *See—*
Elwin, Tore, 3,988,962.

AB Elektronik-Konstruktioner: *See—*
Edstrom, Lennart; and Uddin, Kent, 3,988,928.

Abbe, Robert C.; and Poduje, Noel S., to Ade Corporation. Capacitive thickness gauging for ungrounded elements. 3,990,005, Cl. 324-61.00R.

Abbondanti, Alberto: *See—*
Brennen, Michael B.; and Abbondanti, Alberto, 3,989,991.

Abbott, Frank R., to United States of America, Navy. Towable VLF sonar projector. 3,990,034, Cl. 340-7.00R.

Abbott, Franklin Paul, to Lubrizol Corporation, The. Fuels containing N-substituted morpholines. 3,989,476, Cl. 44-63.000.

Abitbol, M. Maurice. Device for preventing and treating toxemia in pregnant women. 3,988,793, Cl. 5-365.000.

Abo, Masahiro: *See—*
Tsukada, Katsushige; Isobe, Asao; Hayashi, Nobuyuki; Abo, Masahiro; and Ogawa, Ken, 3,989,610.

Abthoff, Jorg; Huttebraucker, Dag-Harald; and Loose, Gunter, to Daimler-Benz Aktiengesellschaft. Overheating protection for an exhaust gas purification block. 3,988,890, Cl. 60-274.000.

Acda, Petrus Marinus, to Polva-Nederland N.V. Device for shaping a bell end to a tube. 3,989,440, Cl. 425-393.000.

Ackrell, Jack, to Syntex (U.S.A.) Inc. 6,11-Dihydrodibenzo-thiepin-11-ones, compositions and uses thereof. 3,989,839, Cl. 424-275.000.

Acushnet Company: *See—*
Isaac, Edward J., 3,989,568.

Adalbert, Gerhard; Dettling, Hubert; and Hess, Jurgen, to Robert Bosch G.m.b.H. Oil separator, especially for a cooling medium compressor. 3,989,490, Cl. 55-385.00C.

Adams, James: *See—*
Lopez, Albert; and Adams, James, 3,988,822.

Adamson, Gerald E.: *See—*
Smith, Richard W.; and Adamson, Gerald E., 3,989,965.

Adamson, Harold C.; and Spector, George, to Adamson, Harold C. Portable building frame connector. 3,988,872, Cl. 52-752.000.

Addressograph Multigraph Corporation: *See—*
Sable, Harvey James, 3,988,988.

Ade Corporation: *See—*
Abbe, Robert C.; and Poduje, Noel S., 3,990,005.

Agee, Forrest J., Jr.; and Roberts, Huey A., to United States of America, Army. Pulsed loop antenna-conduit electromagnetic radiator test technique for electromagnetic shielding flaw detection in buried conduits and shielded conductors. 3,990,003, Cl. 324-52.000.

AGFA-GEVAERT N.V.: *See—*
De Haes, Louis Maria; Vandeputte, Camille Angelina; and Vermeulen, Leon Louis, 3,989,521.
Poot, Albert Lucien; Van Besauw, Jan Frans; and Clement, Frans, 3,989,522.

Aginfor AG Fur Industrielle Forschung: *See—*
Guttinger, Heinrich, 3,989,422.

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Confer, Raymond C.; and Talmon, Floyd H., 3,989,442.

Aishima, Itsuho; Sakurai, Hisaya; Takashi, Yukichi; Morita, Hideo; Ikegami, Tadashi; and Sato, Toshio, to Asahi Kasei Kogyo Kabushiki Kaisha. Catalyst and process of production of polyethylene. 3,989,878, Cl. 526-116.000.

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Hogberg, Bertil; Fex, Hans; Perklev, Torsten; Veige, Sten; and Fredholm, Bo, 3,989,825.

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Prinz, Richard; Elghani, Salah Elabd; Fischer, Winfried; and Alberts, Heinrich, 3,989,770.

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Alburger, James R. Method of regenerating an inspection penetrant solvent. 3,988,924, Cl. 73-104.000.

Alcan Research and Development Limited: *See—*
Morris, Larry Roy, 3,989,548.

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Allan, Barry D., to United States of America, Army. Method of preparing gelled monomethylhydrazine. 3,989,560, Cl. 149-36.000.

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Allen, Dilman F. Portable bracket for electronic transducer. 3,989,213, Cl. 248-214.000.

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Aller, Edmund R., to General American Transportation Corporation. Proportioning device. 3,989,310, Cl. 302-53.000.

Allied Chemical Corporation: *See—*
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Lofquist, Robert Alden; and Haylock, John Christopher, 3,989,455.
Robertson, Arthur B.; Schaffhauser, Robert J.; Lupton, Elmer C.; and Miller, William A., 3,989,873.
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Allington, Robert William, to Instrumentation Specialties Company. Dual beam optical system. 3,989,948, Cl. 250-373.000.

Allison, William D., to Ford Motor Company. Tie rod end. 3,988,818, Cl. 29-149.50B.

Alpert, Seymour Bernard; Sherwin, Martin Barry; and Cochran, Neal Paul, to United States of America, State. Slurry phase methanation process. 3,989,734, Cl. 260-449.600.

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Aluminum Company of America: *See—*
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Amagami, Keizo; Mori, Hazime; Kominami, Hideyuki; and Hirai, Yukio, to Matsushita Electric Industrial Co., Ltd. Induction heating appliance for a cooking utensil. 3,989,916, Cl. 219-10.490.

Amason, Myron P.; and Kung, Joseph T., to McDonnell Douglas Corporation. Aircraft lightning protection means. 3,989,984, Cl. 317-2.00E.

Amax Inc.: *See—*
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Ambrose, Albert Robin, to Dresser Industries, Inc. Adjustable gage cutter scraper for tunneling machines. 3,989,115, Cl. 175-384.000.

Amchem Products, Inc.: *See—*
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American Air Filter Company, Inc.: *See—*
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American Can Company: *See—*
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Anderson, C. Roger; Rusch, Eduard A.; and Seeler, Charles E., to Shure Brothers Inc. Microphone. 3,989,905, Cl. 179-121.00R.

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Anderson, Robert J. Egg marker. 3,988,834, Cl. 33-21.00R.

Anderson, Walter, to International Harvester Company. Twine feed and cutting mechanism for a baler. 3,988,977, Cl. 100-5.000.

Andreadakis, Nicholas C.: *See*—
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APF Corporation: *See*—
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Apostolatos, George Nikolas; Bohrer, James Calvin; and Inamorato, Jack Thomas, to Colgate-Palmolive Company. Antibacterial composition. 3,989,827, Cl. 424-235.000.

Appell, Herbert R.; and Pantages, Peter, to United States of America, Energy Research and Development Administration. Decomposition of carbohydrate wastes. 3,989,480, Cl. 48-209.000.

Appleby, Paul E.; and Smith, Michael W., to Goodyear Tire & Rubber Company, The. Tire building machine server. 3,989,565, Cl. 156-133.000.

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Aries, Robert. Mixed esters of estradiol and zeranol. 3,989,828, Cl. 424-240.000.

Ariga, Masao: *See*—
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Armco Steel Corporation: *See*—
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Armellino, Richard A. Fabrication of armored fabric. 3,988,780, Cl. 2-2.500.

Armstrong Cork Company: *See*—
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Arndt, Henry Clifford: *See*—
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Arneson, Edwin L., to Federal Paper Board Company, Inc. Carton with pour spout. 3,989,171, Cl. 222-541.000.

Aron, Erwin, to Technical Processing, Inc. Rubber compound additive. 3,989,643, Cl. 252-431.00C.

Arps, Jan J. Desulfurization of high sulfur fuels during combustion. 3,989,010, Cl. 122-1.00R.

Arrington, Thomas Lonnie, to Dresser Industries, Inc. Continuous roof support system for tunnel boring. 3,989,302, Cl. 299-11.000.

Artamonov, Viktor Leonidovich: *See*—
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Arthur, Jett C., Jr.; Nakamura, Yoshio; and Hinojosa, Oscar, to United States of America, Agriculture. Process for controlling the macromolecular reactivities of cotton and mercerized cotton. 3,989,454, Cl. 8-120.000.

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Asprey, Larned B., to United States of America, Energy Research and Development Administration. Method of preparing pure fluorine gas. 3,989,808, Cl. 423-503.000.

Associated Rubber Company: *See*—
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Aubert, Gilles; Barras, Gilles; and Costes, Didier, to Commissariat a l'Energie Atomique. Device for closing a pressure vessel. 3,989,290, Cl. 292-256.650.

Auburn Equipment Limited: *See*—
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Aue, Karl. Device for cleaning a toilet. 3,988,788, Cl. 4-233.000.

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Augustine, Paul, Jr.; Fender, Jesse Brian, Jr.; and Hildreth, Donald Laverel. Tennis practice device having pneumatic ball projector. 3,989,245, Cl. 273-29.00A.

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Aust, Ronald; Littlehales, Gerald Claude; Bocock, Michael Arthur; and Izard, Dennis, to Lucas Industries Limited. Multiple circuit thermal circuit breakers. 3,990,028, Cl. 337-46.000.

Austin, Lowell W., to National Steel Corporation. Method of producing metal strip having a galvanized coating on one side. 3,989,604, Cl. 204-28.000.

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AZO-Maschinenfabrik Adolf Zimmermann: *See*—
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Bahouth, Tayseer George, deceased: *See*—
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Baker, Richard M. Corner connector for waterbed pedestals. 3,989,397, Cl. 403-205.000.

Bakula, Melvin S. Belt buckle. 3,988,811, Cl. 24-186.000.

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Becker, Erwin Willi; Ehrfeld, Wolfgang; and Eisenbeiss, Gerd, to Gesellschaft fur Kernforschung m.b.H. Method and device for separating gaseous or vaporous materials, especially isotopes, by means of separation nozzles. 3,989,483, Cl. 55-17.000.
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Bellee, Ernest C.; Breithaupt, Robert C.; Godwin, Donald L.; and Walker, Scott H., to Motorola, Inc. Image element antenna array for a monopulse tracking system for a missile. 3,990,078, Cl. 343-770.000.
Bellmore-Johnson Tool Co.: *See—*
Connellan, William J.; and Hillberg, Robert L., 3,988,849.
Belokin, Paul, Jr. Power take-off for fluorescent light fixtures. 3,989,335, Cl. 339-50.00R.
Bendix Corporation, The: *See—*
Cox, Ronald E., 3,988,927.
Feintuch, Martin W.; and Kaplan, Mark, 3,989,209.
Woodruff, Frank, 3,989,316.
Benecke, Theodor: *See—*
Wiebke, Gunter; Korndorfer, Ludwig; Korndorfer, Eugen; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, 3,989,883.
Benford, Arthur E., to Whirlpool Corporation. Refrigeration apparatus enclosure structure. 3,989,329, Cl. 312-214.000.
Bennett, Jeffrey Henry, to Plessey Handel und Investments A.G. Data transmission systems. 3,990,010, Cl. 325-42.000.

Bennett, Melvin T.: *See—*
Katz, Harold W.; Venturi, Gino; Bennett, Melvin T.; and Edwin, Allan I., 3,990,046.

Benson, George E. Optical plumbing device. 3,988,837, Cl. 33-227.000.

Bentley, Donald J.; and Raible, Donald A., to Bentley Laboratories, Inc. Membrane transfer process and apparatus. 3,989,626, Cl. 210-177.000.

Bentley Laboratories, Inc.: *See—*
Bentley, Donald J.; and Raible, Donald A., 3,989,626.

Benton, Ronald E., to Westinghouse Electric Corporation. Electrical bushing containing a full-range current-limiting fuse. 3,990,031, Cl. 337-202.000.

Berchtold, Jean, to Eastman Kodak Company. Process of manufacturing ferrite bodies of low porosity. 3,989,794, Cl. 264-332.000.

Berger, Bernard B., to Ducane Heating Corporation. Coal grate construction for gas-fired grills. 3,989,028, Cl. 126-41.00R.

Berger, Eugene; Delbouille, Andre; Gerard, Pol; and Derroitte, Jean-Louis, to Solvay & Cie. Process and catalysts for the polymerization and copolymerization of olefins. 3,989,879, Cl. 526-124.000.

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Berger, Heinz Wilhelm: *See—*
Noe, Oskar; and Berger, Heinz Wilhelm, 3,989,202.

Berger, Herbert; Gall, Rudi; Stach, Kurt; Vomel, Wolfgang; and Hoffmann, Rita, to Boehringer Mannheim G.m.b.H. Combating bacteria with nitroimidazolyl-triazolo-pyridiazine compounds. 3,989,832, Cl. 424-250.000.

Berges, David A., to SmithKline Corporation. 7-Acyl-3-(substituted triazolyl thiomethyl)cephalosporins. 3,989,694, Cl. 260-243.00C.

Bergson, Arnold A.; Haren, Ralph J.; and Pelton, Donald A., to Tenneco Inc. Pulse converting exhaust silencing system. 3,989,121, Cl. 181-35.00B.

Berkman, John Worrall; and Pexton, Frederic Cyrus, to International Business Machines Corporation. Cable clamp and strain relief device. 3,989,210, Cl. 248-73.000.

Berman, Elliot, to Exxon Research and Engineering Company. Variable intensity warning light. 3,989,980, Cl. 315-154.000.

Bernhard Beumer Maschinenfabrik KG: *See—*
Remmert, Josef, 3,989,073.

Besenmatter, Walter; Muszumanski, Trude; and Kurz, Gunter, to Vockenhuber, Karl; and Hauser, Raimund. Reflex finder. 3,989,349, Cl. 350-33.000.

Betteridge, Walter: *See—*
Mynard, Brian Arthur; Jones, Bryan; Tracey, Victor Allen; and Betteridge, Walter, 3,989,558.

Betz Laboratories, Inc.: *See—*
Bigley, John J.; and Gaughan, Philip J., 3,989,169.
Swered, Paul; and Ellis, Daniel B., 3,989,585.

BGW Bergwerk-und Walzwerk Maschinenbau G.m.b.H.: *See—*
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Bickel, Hans: *See—*
Scartazzini, Riccardo; and Bickel, Hans, 3,989,695.

Biddlecom, William Gerard: *See—*
Woesner, Warren Dexter; Arndt, Henry Clifford; Biddlecom, William Gerard; Peruzzotti, George Peter; and Sih, Charles John, 3,989,744.

Biegelsen, David K., to Xerox Corporation. Acoustic residue algebra decoder. 3,990,072, Cl. 340-347.0DD.

Bien, Hans-Samuel: *See—*
Hohmann, Walter; Herzog, Helmut; and Bien, Hans-Samuel, 3,989,450.

Bier, Thomas H., to Dorr-Oliver Incorporated. Degritting and fiber removal system. 3,989,628, Cl. 210-255.000.

Bigley, John J.; and Gaughan, Philip J., to Betz Laboratories, Inc. Automatic self-leveling fluid dispenser. 3,989,169, Cl. 222-207.000.

Billings, Charles Alden; O'Neill, Gerald Joseph; Simons, Charles William; and Holdsworth, Robert S., to W. R. Grace & Co. Anesthetic chlorocyclopropanes. 3,989,845, Cl. 424-352.000.

Billottet, Henri: *See—*
Gleitz, Jean-Jacques; Narbaits-Jaureguy, Jean-Raymond; and Billottet, Henri, 3,990,040.

Bio-Data Corporation: *See—*
Kent, Frederick M.; and Sokol, Michael, 3,989,382.

Bio-Technology Instruments Corporation: *See—*
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Biocraft Laboratories, Inc.: *See—*
Mazzacca, Alfred J., 3,989,688.

Birks, Laverne S.; and Fatemi, Mohammad, to United States of America, Navy. Parallel-beam X-ray optics for messuring asbestos. 3,989,944, Cl. 250-272.000.

Birum, Gail H., to Monsanto Company. Urea-phosphorus compounds. 3,989,727, Cl. 260-347.300.

Bissonette, Vernon Leon, to Eastman Kodak Company. Processing compositions comprising inert transition metal complex oxidizing agents and reducing agents. 3,989,526, Cl. 96-48.00R.

Bivins, Oliver W.: *See—*
Flick, Joseph J., 3,988,978.

Bjerk, Roger O.: *See—*
Walker, Donald F.; Bjerk, Roger O.; and Powers, Harold C., 3,989,425.

Bjorlund, John. Reflection device. 3,989,351, Cl. 350-97.000.

Black, Robin Michael: *See—*
White, Alan Chapman; and Black, Robin Michael, 3,989,709.

Black, Sivalls & Bryson, Inc.: *See—*
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Blackledge, Vernon O.: *See—*
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Blackstone Corporation: *See—*
Antonevich, John N., 3,989,179.

Blanchier, Jean-Claude, to Jaeger. Device for transmitting the condition of a switch between two parts in relative rotary movement. 3,990,041, Cl. 340-58.000.

Blank, Wilhelm, to Klein, Schanzlin & Becker Aktiengesellschaft. Apparatus for circulating cooling and lubricating liquids and the like particularly after shutdown of the apparatus. 3,989,966, Cl. 310-68.00C.

Blasko, Andrew G., to Asplundh Tree Expert Company. Brush chipper and brake assembly usable therewith. 3,989,198, Cl. 241-101.700.

Bledsoe, Woodrow W. Apparatus for cleaning seed cotton. 3,988,806, Cl. 19-203.000.

Bliss, Donald B., to Bolt Beranek and Newman, Inc. Method of and apparatus for preventing leading edge shocks and shock-related noise in transonic and supersonic rotor blades and the like. 3,989,406, Cl. 415-1.000.

Blose, Thomas L., to Hydril Company. Tubular connection. 3,989,284, Cl. 285-332.200.

Blount, George W., to New Century Products, Inc. Resilient seats and cover lids therefor for water closets. 3,988,789, Cl. 4-234.000.

Boatman, Billy J., to Sedalia Neon Company. Sign device having magnetic display characters. 3,988,845, Cl. 40-142.00A.

Bockmann, August: *See—*
Rudolph, Hans; Bockmann, August; Goerden, Leonhard; Walter, Oskar; and Schulz-Walz, HansJochen, 3,989,655.

Bocks, Paul J.; Grammel, Jurgen; and Neumaier, Hermann, to Bayer Aktiengesellschaft. Plastic sheet adhered to polyurethane ionomer latex foam. 3,989,870, Cl. 428-315.000.

Bocock, Michael Arthur: *See—*
Aust, Ronald; Littlehales, Gerald Claude; Bocock, Michael Arthur; and Izard, Dennis, 3,990,028.

Bodor, Nicolae S., to Interx Research Corporation. Soft quaternary surface active agents exhibiting antibacterial activity. 3,989,711, Cl. 260-309.000.

Bodway, George E., to Hewlett-Packard Company. Method for manufacturing thin film circuits. 3,988,824, Cl. 29-577.000.

Boehringer Mannheim G.m.b.H.: *See—*
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Boeing Company, The: *See—*
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Masreliez, C. Johan, 3,989,961.
Moji, Yukimori; and Marceau, J. Arthur, 3,989,876.

Bohlscheid, Peter: *See—*
Kiefer, Erich; Rolniczak, Heinz; and Bohlscheid, Peter, 3,989,437.

Bohm, Heinz-Dieter; Brieseck, Christian; and Ruggen, Werner, to Maschinenfabrik Stromag G.m.b.H. Flexible torque-transmitting element for couplings and couplings including such elements. 3,988,907, Cl. 64-13.000.

Bohrer, James Calvin: *See—*
Apostolatos, George Nikolas; Bohrer, James Calvin; and Inamorato, Jack Thomas, 3,989,827.

Bohrn, Walter J., to Armstrong Cork Company. Overprint of solvent on total solvent coating. 3,989,448, Cl. 8-14.000.

Bojas, Edward J.; and Ward, Harold R., to Eaton Corporation. Hydrostatic transmission drive system. 3,988,893, Cl. 60-445.000.

Bolon, Donald A.; Lucas, Gary M.; and Jaffe, Mary S., to General Electric Company. Radiation curable inks. 3,989,644, Cl. 252-514.000.

Bolt Beranek and Newman, Inc.: *See—*
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Bomba, Gerhard. Method of cultivating epiphytically growing plants. 3,988,858, Cl. 47-58.000.

Bomba, Steven J.: *See—*
Hartmann, Clinton S.; Bomba, Steven J.; and Tenny, Ralph F., 3,990,021.

Bondy, Clemens, to Revertex Ltd. Method for enlarging the particle size of polymers prepared by aqueous emulsion polymerization. 3,989,661, Cl. 260-29.7PT.

Bonnington, Michael G., to British Industrial Plastics Limited. Modified synthetic thermosetting resins and compositions containing same. 3,989,769, Cl. 260-873.000.

Booher, Claude R., Jr., to Westinghouse Electric Corporation. High density ceramic turbine members. 3,988,866, Cl. 51-283.000.

Boozalis, Theodore S.; Ivy, John B.; and Willis, Gordon G., to Dow Chemical Company, The. Purification of 1,1,1-trichloroethane by extractive distillation. 3,989,601, Cl. 203-61.000.

Bore, Pierre: *See—*
Kalopissis, Gregoire; Bugaut, Andree; Estradier, Francoise; Ghilardi, Giuliana; Grollier, Jean-Francois; and Bore, Pierre, 3,989,447.

Borg-Warner Corporation: *See—*
Newton, Alwin B., 3,989,104.

Borovec, Vaclav: *See—*
Hrdina, Karel; Dostal, Jaroslav; and Borovec, Vaclav, 3,989,069.

Bosch, Paul, to Robert Bosch G.m.b.H. Regulating arrangement for hydraulic pumps. 3,988,892, Cl. 60-420.000.

Bose, Arun C.: *See—*
Buckholtz, Harry E.; Bose, Arun C.; and Graham, John C., 3,989,715.

Bosley, Roy E.; Mann, Paul T.; Decoteau, Gary D.; Ivie, Kert F.; and Winslow, Elden D., to J. R. Simplot Company. Method and apparatus for treating vegetable segments. 3,988,953, Cl. 83-2.000.

Bossert, Friedrich: *See—*
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Boule, Wilfred L.: *See—*
Cangiano, Frank; Reed, Stephen A., III; Boule, Wilfred L.; and Dayton, David R., 3,989,549.

Bourne, William R., Jr.: *See—*
Poe, L. Richard; Davis, Clifford A.; and Bourne, William R., Jr., 3,988,808.

Bowler, Edward F., Jr.; and Rengert, Thomas A., to Xerox Corporation. Oil metering blade device. 3,989,005, Cl. 118-60.000.

BP Chemicals International Limited: *See—*
Goldsworthy, Peter John; and Scudamore, Mark John, 3,989,660.

Brace, Neal O., to Ciba-Geigy Corporation. Perfluoroalkylthio norbornane 2,3-dicarboxylic acid compounds. 3,989,725, Cl. 260-346.300.

Brack, Karl, to Dennison Manufacturing Company. Radiation curable resistant coatings and their preparation. 3,989,609, Cl. 204-159.150.

Brackmann, Warren A.; and Dilanni, Daniel, to Rothmans of Pall Mall Canada Limited. Tobacco filler rod production. 3,989,052, Cl. 131-84.00B.

Braden, Rudolf; and Knupfer, Hans, to Bayer Aktiengesellschaft. Process for the preparation of 4,4'-diaminostilbene-2,2'-disulphonic acid. 3,989,743, Cl. 260-510.000.

Bradley, William Jack; and Marsan, Mario Stephen, to Procter & Gamble Company, The. Bleaching article. 3,989,638, Cl. 252-186.000.

Brady, Jack D.; and Legatski, Lester K., to FMC Corporation. Process for removing sulfur oxides from gas streams. 3,989,797, Cl. 423-242.000.

Braithwaite, David G.; and Hettinger, William P., Jr., to NL Industries, Inc. Method for producing high bulk density magnesium chloride. 3,989,472, Cl. 23-293.00A.

Brandenstein, Zane G., to Emerson Electric Co. Modulated electric slip clutch. 3,989,129, Cl. 192-84.00R.

Brandhorst, Henry W., Jr., to United States of America, National Aeronautics and Space Administration. Solar cell assembly. 3,989,541, Cl. 136-89.000.

Brandl, Hermann Josef: *See—*
Collin, Heinrich; Mosburger, Hans; Lau, Gunther; and Brandl, Hermann Josef, 3,989,576.

Brandstetter, Walter; Decker, Gerd; and Reichel, Kurt, to Volkswagenwerk Aktiengesellschaft. Ignited internal combustion engine operated with charge stratification. 3,989,014, Cl. 123-32.0SP.

Brandt, Larry A.; and Johnson, Bruce R. Fuel heating apparatus. 3,989,019, Cl. 123-122.00E.

Brannon, Donald R.; and Neuss, Norbert, to Eli Lilly and Company. N-demethylation of indole alkaloids by *S. albogriseolus*. 3,989,593, Cl. 195-29.000.

Branson, Charles D.; and Demi, Roy C., to Robertshaw Controls Company. Fuel control system and control device therefor or the like. 3,989,064, Cl. 137-614.110.

Branson, Charles D., to Robertshaw Controls Company. Fuel control system and method of operating the same and diverter valve therefor. 3,989,188, Cl. 236-15.00A.

Brassat, Bert; and Brockmann, Rolf, to Bayer Aktiengesellschaft. Process for the production of polyamides. 3,989,677, Cl. 260-78.00L.

Braun Aktiengesellschaft: *See—*
Schroder, Adolf; and Klauer, Hans Dieter, 3,989,071.

Brawley, Thomas Scott. Lapping or grinding apparatus and method. 3,988,861, Cl. 51-3.000.

Breco Kunststoffverarbeitungs-GmbH & Co. KG: *See—*
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Breher, Rudolf: *See—*
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Breithaupt, Robert C.: *See—*
Bellee, Ernest C.; Breithaupt, Robert C.; Godwin, Donald L.; and Walker, Scott H., 3,990,078.

Brennen, Michael B.; and Abbondanti, Alberto, to Westinghouse Electric Corporation. Method and circuit for the derivation of an analog slip frequency signal of an induction motor in a tachometerless motor drive. 3,989,991, Cl. 318-231.000.

Brennen, Michael B.: *See—*
Thompson, Francis T.; and Brennen, Michael B., 3,989,999.

Breslow, Jeffrey D., to Marvin Glass & Associates. Reaction game apparatus. 3,989,243, Cl. 273-1.00R.

Breslow, Jeffrey D., to Marvin Glass & Associates. Game apparatus. 3,989,249, Cl. 273-87.00R.

Breudigam, Richard L., to Cleveland Vibrator Company, The. Vibratory screener. 3,989,621, Cl. 209-326.000.

Breuer, Hermann; and Treuner, Uwe D., to E. R. Squibb & Sons, Inc. 3-Heterothio[(oxyalkyl)thioacetyl]cephalosporin derivatives. 3,989,696, Cl. 260-243.00C.

Brewer, Jimmy Milton; and Tindle, John Thomas, to Refrigerated Products, Inc. Dual acting defrost system for ice makers and controls therefor. 3,988,903, Cl. 62-138.000.

Bridge, William A., to Dow Chemical Company, The. Method for the preparation of plastic film. 3,989,785, Cl. 264-95.000.

Brieseck, Christian: *See—*
Bohm, Heinz-Dieter; Brieseck, Christian; and Ruggen, Werner, 3,988,907.

Brigham, Loraine M., sole heir: *See—*
Brigham, Roger S., deceased; and Brigham, Loraine M., sole heir, 3,989,001.

Brigham, Roger S., deceased; and by Brigham, Loraine M., sole heir, to Continental Can Company, Inc. Machine for spray-coating can body exteriors. 3,989,001, Cl. 118-7.000.

Brinkman, Eugene V.: *See—*
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British Cast Iron Research Assoc.: *See—*
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British Gas Corporation: *See—*
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British Industrial Plastics Limited: *See—*
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British Leyland UK Limited: *See—*
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Finch, Peter Molyneux; Goff, Robert William; and Sykes, Christopher John, 3,989,275.

British Steel Corporation: *See—*
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Brockett, Frank Howard, III, to International Nickel Company, Inc., The. Mining transition chamber. 3,988,843, Cl. 37-57.000.

Brockman, John A., to American Cyanamid Company. Process for separating proteins from central nervous system tissue and treating experimentally induced demyelinating diseases. 3,989,819, Cl. 424-95.000.

Brockmann, Rolf: *See—*
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Brokke, Mervin E.: *See—*
Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., 3,989,503.

Brook, Greville B.; and Ilies, Roger F., to Fulmer Research Institute Limited. Method of making a heat-recoverable article. 3,989,551, Cl. 148-11.50R.

Brook, Greville B.; and Ilies, Roger F., to Fulmer Research Institute Limited. Method of making a heat-recoverable article. 3,989,552, Cl. 148-11.50R.

Brookhart, Rex D., to de Lorme Marketing Corporation. Method for making a non-rigid laminar core. 3,989,789, Cl. 264-136.000.

Brophy, Robert V., to USM Corporation. Pallet for registering and securing a workpiece. 3,988,993, Cl. 112-121.120.

Broussard, Jerry A.; and Fisher, Gene J., to Celanese Corporation. Method of preparing polyalkylene glycol acrylates. 3,989,740, Cl. 260-486.00R.

Broussard, Joseph Tracy, to Nalco Chemical Company. Upper strata chlorination of upper sections of clarifiers. 3,989,143, Cl. 210-62.000.

Brouwers, Sytze; Brune, Gerhard; Hans, Waldemar; and Staib, Helmut, to Robert Bosch G.m.b.H. Electromagnetic 3-way valve. 3,989,063, Cl. 137-596.170.

Brown, Alvin I.; Stein, Sylvan P.; and Swensen, Eugene L. Tennis practice system. 3,989,246, Cl. 273-29.00A.

Brown Boveri-Sulzer Turbomachinery, Ltd.: *See—*
Mukherjee, Dilip, 3,989,412.

Brown, Earle S., to Union Carbide Corporation. Divalent metal salts of dodecametal triaconta carbonyls. 3,989,799, Cl. 423-249.000.

Brown, William C., to Raytheon Company. Space oriented microwave power transmission system. 3,989,994, Cl. 321-1.500.

Bruggemann & Brand KG: *See—*
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Brune, Gerhard: *See—*
Brouwers, Sytze; Brune, Gerhard; Hans, Waldemar; and Staib, Helmut, 3,989,063.

Bruner, Leonard Bretz; and Koch, Kenneth Elmon, Jr., to SWS Silicones Corporation. Method for preparing silicone rubber molds. 3,989,790, Cl. 264-225.000.

Bruni, James G.; and Goodin, John W., to Baxter Laboratories, Inc. Retractable handle assembly. 3,988,802, Cl. 16-115.000.

Brunkow, Darwin D. Thumb rest for a musical wind instrument. 3,988,958, Cl. 84-453.000.

Brunnhofer, Erwin, to Reifenhauser KG; and Gofini AG. Method of calibrating extruded filaments. 3,989,779, Cl. 264-40.200.

Brunswick Corporation: *See—*
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Bruun, Herta: *See—*
Feit, Peter Werner; Nielsen, Ole Bent Tvaermose; and Bruun, Herta, 3,989,745.

Buchalter, Gilbert. Process for utilizing certain gel compositions for electrical stimulation. 3,989,050, Cl. 128-419.00R.

Buchanan, David Henry, to Olin Corporation. Bolt identification system. 3,988,959, Cl. 85-77.000.

Buckholtz, Harry E.; Bose, Arun C.; and Graham, John C., to Hooker Chemicals & Plastics Corporation. Process for manufacturing chlorothianthrenes. 3,989,715, Cl. 260-327.00P.

Budrys, Ignas; and Right, Robert W., to General Signal Corporation. Speaker supervision in a public address system. 3,989,908, Cl. 179-175.10A.

Buerger, Herbert, to Del-Met Corporation. Wire wheel simulating wheel cover assembly. 3,989,306, Cl. 301-37.0CM.

Bugaut, Andree: *See—*
Kalopissis, Gregoire; Bugaut, Andree; Estradier, Francoise; Ghilardi, Giuliana; Grollier, Jean-Francois; and Bore, Pierre, 3,989,447.

Buhrer, Erwin. Method of and apparatus for the production of mold parts for foundries. 3,989,086, Cl. 164-22.000.

Bulanov, Sergei Sergeevich: *See—*
Khaidurov, Efim Leontievich; Razorenov, Vladimir Alexandrovich; Bulanov, Sergei Sergeevich; and Gorbov, Oleg Mikhailovich, 3,988,963.

Bull, Duncan C.; and Solomons, Gerald L., to Ranks Hovis McDougall Limited. Process and apparatus for liquid and gas separation. 3,989,599, Cl. 195-105.000.

Bunka Shutter Kabushiki Kaisha: *See—*
Inamura, Kosuke; and Takasaka, Ikira, 3,989,084.

Bunker Ramo Corporation: *See—*
Pechard, Lucien; Logerot, Bernard; and Huguenet, Jean-Pierre, 3,989,344.

Bunno, E. James: *See—*
Lee, Wilson J.; Wilson, Clotis A., Sr.; Howell, Vincent E.; and Bunno, E. James, 3,989,146.

Burgess, Allen L. Post-mounted fence board support brackets. 3,989,226, Cl. 256-65.000.

Burkhardt, Joseph A.; Childers, Thomas W.; and Koerner, Roger J., to Exxon Production Research Company. Rotary motion failsafe gate valve actuator. 3,989,223, Cl. 251-58.000.

Burndy Corporation: *See—*
Stelling, Richard P., 3,989,337.

Burroughs Corporation: *See—*
Ogle, James A.; and Holz, George E., 3,989,981.

Burton, Carl. Dirt compacting and asphalt compacting roller unit. 3,989,404, Cl. 404-128.000.

Burwell by said Oded E. Sturman and said Benjamin Grill, Clifton J.: *See—*
Sturman, Oded E.; Grill, Benjamin; and Froman, Yigal, 3,989,066.

Busanovich, Charles John; and Moore, Robert Milton, to RCA Corporation. Selenium rectifier having hexagonal polycrystalline selenium layer. 3,990,095, Cl. 357-15.000.

Busch, Albert E.; Hotsenpiller, John R.; and Redding, James V., to Sarkes Tarzian, Inc. Horizontal and vertical soft edge video transition system with edge compression. 3,989,888, Cl. 178-6.800.

Bush, Philip D.; and Bailey, Derek W. Solvent extraction and electrowinning of zinc and copper from sulfate solution. 3,989,607, Cl. 204-108.000.

Buter, Edward J. Cooking utensil having boil-control member. 3,988,975, Cl. 99-415.000.

Butler, John Francis; and Babyak, William John, to Jones & Laughlin Steel Corporation. Method and apparatus for vapor-depositing coatings on substrates. 3,989,862, Cl. 427-251.000.

Byers, Jimmy F., to United States of America, Navy. Housing configuration for high resolution sonar. 3,990,035, Cl. 340-8.00R.

C. Hager & Sons Hinge Manufacturing Company: *See—*
Peterson, Francis C., 3,988,859.

Cady, John Billington, to British Leyland UK Limited. Public service vehicle. 3,989,119, Cl. 180-89.00R.

Calcagno, Benedetto; Divo, Claudio; and Ghirga, Marcello, to Societa' Italiana Resine S.I.R. S.p.A. Process for the production of vinyl acetate from ethylene. 3,989,742, Cl. 260-497.00A.

California Portland Cement Company: *See—*
Campbell, William C., 3,989,443.

Calspan Corporation: *See—*
Baier, Robert E.; and Wright, Alfred, 3,988,932.

Cameron, Warde Mitchell, Jr.: *See—*
Gwilliam, James L., Jr.; and Cameron, Warde Mitchell, Jr., 3,989,142.

Campau, Daniel N., to Pepsico, Inc. Golf club having insert capable of elastic flexing. 3,989,248, Cl. 273-78.000.

Campbell, John E.; Harley, Douglas A.; Lee, Herbert S.; and Juhasz, John E. Angularly adjustable optical switch assembly. 3,989,943, Cl. 250-233.000.

Campbell, William C., to California Portland Cement Company. Multiple fuel burner and usage in rotary kilns. 3,989,443, Cl. 431-8.000.

Canada Wire and Cable Limited: *See—*
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Canadian Patents and Development Limited: *See—*
Werstiuk, Nick Henry; and Kadai, Tonu, 3,989,705.

Candelaria, Arthur R. Cycle safety and locker device. 3,989,327, Cl. 312-100.000.

Cangiano, Frank; Reed, Stephen A., III; Boule, Wilfred L.; and Dayton, David R., to GTE Sylvania Incorporated. Method of making incandescent lamp. 3,989,549, Cl. 148-6.300.

Canoga Controls Corporation: *See—*
Koerner, Ralph J., 3,989,932.

Canon Kabushiki Kaisha: *See—*
Komori, Shigehiro; Ariga, Masao; and Nitanda, Hiroshi, 3,989,236.

Canova, Levy A., to SCM Corporation. Synthetic lavandin oil. 3,989,646, Cl. 252-522.000.

Capozza, Richard Carl, to American Cyanamid Company. Solution of poly(N-acetyl-D-glucosamine). 3,989,535, Cl. 106-203.000.

Capurka, Zbynek Antonin: *See—*
Lai, Chi Sun; and Capurka, Zbynek Antonin, 3,989,024.

Carlo, James Thomas, to Texas Instruments Incorporated. Parallel access bubble memory. 3,990,037, Cl. 340-174.0TF.

Carlo, James Thomas; and Lam, Hon Wai, to Texas Instruments Incorporated. Magnetic bubble detector. 3,990,059, Cl. 340-174.0TF.

Carpano & Pons S.A.: *See—*
Lemery, Jean-Paul, 3,989,204.

Carr, George W., to Pullman Incorporated. Twist lock arrangement for tying container down. 3,989,294, Cl. 296-35.00A.

Carrow, Guy E.: *See—*
Scott, John N., Jr.; and Carrow, Guy E., 3,989,787.

Carson, Andrew B., Jr., to General Electric Company. Ribbon storage and transport mechanism. 3,989,132, Cl. 197-168.000.

Carver, Robert W. Method and apparatus for reducing noise content in audio signals. 3,989,897, Cl. 179-1.00P.

Carver, Thomas G.: *See—*
Bell, Richard; Sato, Takao; Lahiri, Chitta R.; and Carver, Thomas G., 3,989,868.

Casey, William J.: *See—*
Doundoulakis, George J., 3,989,012.

Casio Computer Co., Ltd.: *See—*
Kashio, Toshio, 3,988,886.

Catapano, Joseph V. Safety drug cabinet. 3,988,909, Cl. 70-63.000.

Caterpillar Tractor Co.: *See—*
Cole, Carroll R.; and Easterling, Gene B., 3,989,112.
Goloff, Alexander; Barker, Noble G.; and Ritchie, James A., 3,989,424.
Hansen, Howard A., 3,989,118.
Reinsma, Harold L.; McFeeters, Robert D.; and Linne, Terry D., 3,989,314.
Ritchie, James A., 3,989,421.
Walker, Donald F.; Bjerk, Roger O.; and Powers, Harold C., 3,989,425.

Cauldwell, Jack D., to Arvin Industries, Inc. Cable television tap connector box. 3,989,333, Cl. 339-17.00C.

Cayen, Donald J.; Ehrhardt, Orville W.; and Fatke, Richard V., to Giddings & Lewis, Inc. Two pressure counterbalance system for machine tool headstocks. 3,988,965, Cl. 90-11.00F.

CCI Life Systems, Inc.: *See—*
Marantz, Laurence B.; and Giorgianni, Mario G., 3,989,622.

Celanese Corporation: *See—*
Broussard, Jerry A.; and Fisher, Gene J., 3,989,740.

Cepuritis, Talivaldis; and Tritsch, Ludwig, to Johnson & Johnson. Diaper with loop-type adhesive fastener. 3,989,047, Cl. 128-287.000.

Cepuritis, Talivaldis; and Tritsch, Ludwig, to Johnson & Johnson. Diaper with loop-type adhesive fastener releasably secured to diaper facing. 3,989,048, Cl. 128-287.000.

Chabert, Pierre; Foulletier, Louis; and Lantz, Andre, to Produits Chimiques Ugine Kuhlmann. Emulsification of fluorocarbon compounds for biological application as oxygen transporters. 3,989,843, Cl. 424-325.000.

Chamay, Anthony Joseph; Smith, James; and Hull, Thomas Neil, Jr., to General Electric Company. Cowling arrangement for a turbofan engine. 3,988,889, Cl. 60-226.00A.

Chamberlin, Edward R., to Standex International Corporation. Pincushion correction transformer. 3,990,030, Cl. 336-65.000.

Chambers, Carl R.: *See—*
Banta, Charles C.; and Chambers, Carl R., 3,988,961.

Chambers, Charles W., Jr., to Lorain Products Corporation. Repeater for transmission lines of differing lengths. 3,989,907, Cl. 179-170.00R.

Chambers, Ramon P.: *See—*
Gordy, Robert S.; Chambers, Ramon P.; Sanders, David E.; and Morrison, Cameron E., 3,990,015.

Champion International Corporation: *See—*
Cottrell, Edward D., 3,989,201.

Chan, See Fong. Liquid-solid dispenser. 3,989,167, Cl. 222-145.000.

Chandler, Bruce Veness; and Johnson, Robert Leonard, to Commonwealth Scientific and Industrial Research Organization. Contacting citrus juice with a cellulose ester adsorbent to remove limonin. 3,989,854, Cl. 426-422.000.

Chandler, Jon A.: *See—*
Lorenz, John J.; and Chandler, Jon A., 3,989,259.

Chant, Peter R., to Shell Oil Company. Process for producing a fibrous reinforced thermosetting resin impregnated foamed polymeric resin article. 3,989,781, Cl. 264-46.400.

Chapman, Arthur S., to Hughes Aircraft Company. Telescope cluster. 3,989,947, Cl. 250-338.000.

Chapman, Richard A.; and Bean, Kenneth E., to Texas Instruments Incorporated. Arrays for infrared image detection. 3,989,946, Cl. 250-332.000.

Chaprnka, Anthony G.; and McKenzie, Patrick J., to Westinghouse Electric Corporation. Wide range pulse generator. 3,989,998, Cl. 321-61.000.

Charransol, Pierre; Salle, Jacques; and Becker, Jacques, to International Standard Electric Corporation. Synchronism error detecting and correcting system for a circulating memory. 3,989,894, Cl. 178-69.50R.

Charters, Michael T.; and Landis, Franklin F., to Bauer Bros. Co., The. Apparatus for producing kraft type pulp. 3,989,588, Cl. 162-234.000.

Chatigny, Raymond E., to Harrington & Richardson, Inc. Safety device for firearms. 3,988,848, Cl. 42-70.00F.

Chen, Thomas T.: *See—*
Archer, John L.; Tocci, Leonard; and Chen, Thomas T., 3,990,058.

Chenaux, Bernard: *See—*
Feuillade, Georges; Chenaux, Bernard; and Perche, Philippe, 3,989,540.

Cherrin, Abe: *See—*
Cherrin, Phil, 3,989,175.

Cherrin, Lem: *See—*
Cherrin, Phil, 3,989,175.

Cherrin, Phil, to Cherrin, Phil; Cherrin, Abe; and Cherrin, Lem. Dispenser for adhesive products. 3,989,175, Cl. 225-76.000.

Chevron Research Company: *See—*
Jaffe, Joseph, 3,989,619.
Suzuki, Shigeto, 3,989,726.

Chiang, Mutong T.: *See—*
Milkovich, Ralph; and Chiang, Mutong T., 3,989,768.

Chiba, Shozo: *See—*
Kiga, Shotaro; Chiba, Shozo; Edahiro, Kenichi; Yoshida, Naoshi; and Nagasawa, Masuo, 3,989,615.

Chicago Pneumatic Tool Company: *See—*
Spring, Edward F., Sr.; and Schaedler, Raymond J., 3,989,113.

Childers, Thomas W.: *See—*
Burkhardt, Joseph A.; Childers, Thomas W.; and Koerner, Roger J., 3,989,223.

Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT: *See—*
Huhn, Magda; Tardos, Laszlo; Somfai, Eva; Resorszki, Gabor; Kovacs nee Mindler, Vera; and Palffy nee Oswald, Maria, 3,989,837.

Chou, Eddie C.; Crnojevich, Ranko P.; and Koehler, Harold, to Amax Inc. Catalytic hydrogen reduction of metals from solutions. 3,989,509, Cl. 75-.50A.

Chrobak, Dennis S., to Goodyear Tire & Rubber Company, The. Tire with specially designed multiple carcass plies. 3,989,083, Cl. 152-354.000.

Chromalloy-Alcon, Inc.: *See—*
DeVito, Charles P., 3,989,345.

Chrysler Corporation: *See—*
Allardyce, Gordon E.; Roy, Amedee;; and Belleau, Claude, 3,989,096.

Chubu Seiko Kabushiki Kaisha: *See—*
Ueda, Shigekazu; and Shino, Masakazu, 3,988,807.

Ciba-Geigy Corporation: *See—*
Brace, Neal O., 3,989,725.
Hugelshofer, Paul, 3,989,452.
Rodriguez, Herman Robert, 3,989,689.
Scartazzini, Riccardo; and Bickel, Hans, 3,989,695.

Cicero, Edward. Golf club. 3,989,256, Cl. 273-167.00J.

Cieszko, Joseph T.; and Moon, Charles L., to White Motor Corporation. Method and apparatus for cooling and deaerating internal combustion engine coolant. 3,989,103, Cl. 165-110.000.

Cimaroli, Richard J.: *See—*
Skocypec, Russell; Crowther, Joseph C., Jr.; and Cimaroli, Richard J., 3,989,461.

Citizen Watch Co., Ltd.: *See—*
Kikuyama, Akira; Toyama, Nobuo; and Takahashi, Shigekazu, 3,989,967.

City University, The: *See—*
Field, Brian Orlando; and Sanyal, Dilip Kumar, 3,989,801.

Ciustea, Gheorghe: *See—*
Niculescu-Duvaz, Ion; Feyns, Liviu Valentin; Suster, Dan; and Ciustea, Gheorghe, 3,989,703.

CKD PRAHA, oborovy podnik: *See—*
Voboril, Bohuslav; Reichel, Pavel; and Kafunek, Pavel, 3,989,095.

Clark, Harold E., to Xerox Corporation. Character coding and recognition system. 3,990,043, Cl. 340-146.30B.

Clark, Jack Phillip; Smith, Thurman Dale; and Foster, Alan Carl, to General Electric Company. Vessel examination system. 3,988,922, Cl. 73-67.80S.

Clark, William Donald Kennedy, to Exxon Research and Engineering Company. Photogalvanic device. 3,989,542, Cl. 136-89.000.

Clean Air Company Inc. "CASCA": *See—*
Winquist, Knut Ludvig, 3,989,774.

Cleff, Herbert, to Dorma-Baubeschlag GmbH & Co. KG. Device for arresting a door. 3,989,286, Cl. 292-181.000.

Clement, Frans: *See—*
Poot, Albert Lucien; Van Besauw, Jan Frans; and Clement, Frans, 3,989,522.

Cleveland Vibrator Company, The: *See—*
Breudigam, Richard L., 3,989,621.

Cline, Carl F.: *See—*
Tanner, Lee E.; Ray, Ranjan; and Cline, Carl F., 3,989,517.

Cline, Harvey E.; and Anthony, Thomas R., to General Electric Company. Deep buried layers for semiconductor devices. 3,990,093, Cl. 357-60.000.

Cochran, Neal Paul: *See—*
Alpert, Seymour Bernard; Sherwin, Martin Barry; and Cochran, Neal Paul, 3,989,734.

Coffey, John Albert: *See—*
Stalley, Anthony Donald; and Coffey, John Albert, 3,990,103.

Cognacq, Jean-Claude, to Societe Anonyme dite: Hexachimie. 1-Aminomethyl-2,2-diaryl-cyclopropane carboxamides. 3,989,722, Cl. 260-343.700.

Cohen, Leonard George; Fleming, James William, Jr.; and French, William George, to Bell Telephone Laboratories, Incorporated. Multimode optical fiber. 3,989,350, Cl. 350-96.0WG.

Cole, Carroll R.; and Easterling, Gene B., to Caterpillar Tractor Co. Motor grader drawbar assembly with fluid-operated cylinders for restraining circle gear. 3,989,112, Cl. 172-796.000.

Colee, Donald D. Pressure differential valve for swimming pool. 3,988,787, Cl. 4-172.170.

Colgate-Palmolive Company: *See—*
Apostolatos, George Nikolas; Bohrer, James Calvin; and Inamorato, Jack Thomas, 3,989,827.
Cordon, Martin; and Norfleet, James, 3,989,814.
Januszewski, Joseph Paul; Bahouth, Tayseer George, deceased; and Bahouth, Zaher G., administrator, 3,989,813.
Steltenkamp, Robert John, 3,989,765.

Collin, Heinrich; Mosburger, Hans; Lau, Gunther; and Brandl, Hermann Josef, to Bayerische Bert- Hutten- und Salzwerke AG. Apparatus for connecting a first web of a web form material, which web unwinds from a first roll, to the lead end of a second web of a web-form material, which web unwinds from a second roll. 3,989,576, Cl. 156-361.000.

Colortronic Co., Ltd.: *See—*
Noguchi, Haruo; and Reinhard, Max, 3,989,229.

Colortronic Reinhard & Co. K.G.: *See—*
Noguchi, Haruo; and Reinhard, Max, 3,989,229.

Colt Industries Operating Corporation: *See—*
Fish, David H.; Knodel, Charles H.; Keen, Harry J.; and Barrett, Paul, 3,990,032.

Columbia Ribbon and Carbon Manufacturing Co., Inc.: *See—*
Newman, Douglas A., 3,989,569.

Comly, Daniel P., Jr., to FMC Corporation. Conveyor indexing mechanism. 3,988,936, Cl. 74-34.000.

Commissariat a l'Energie Atomique: *See—*
Aubert, Gilles; Barras, Gilles; and Costes, Didier, 3,989,290.

Commonwealth Scientific and Industrial Research Organization: *See—*
Chandler, Bruce Veness; and Johnson, Robert Leonard, 3,989,854.
Guise, Geoffrey Bruce, 3,989,458.

Compagnie Generale d'Electricite: *See—*
Duchet, Michel, 3,989,360.
Feuillade, Georges; Chenaux, Bernard; and Perche, Philippe, 3,989,540.
Tardy, Andre, 3,989,567.

Comstock, Lowell Ray: *See—*
Gerkin, Richard Michael; and Comstock, Lowell Ray, 3,989,676.

Confer, Raymond C.; and Talmon, Floyd H., to Air-Lock Plastics, Inc. Apparatus for blow molding thermoplastic material. 3,989,442, Cl. 425-503.000.

Conklin, Richard H., to Lawrence Peska Associates, Inc., a part interest. Invertable fuel tank. 3,989,155, Cl. 220-1.00B.

Connellan, William J.; and Hillberg, Robert L., to Bellmore-Johnson Tool Co. Signal launcher. 3,988,849, Cl. 42-70.00G.

Continental Can Company, Inc.: *See—*
Brigham, Roger S., deceased; and Brigham, Loraine M., sole heir, 3,989,001.
Shaw, Fred B.; and DuPuis, Clyde F., 3,989,165.

Continental Group, Inc., The: *See—*
Pelton, Peter G., 3,989,061.

Control Data Corporation: *See—*
Mayer, William N.; and Andreadakis, Nicholas C., 3,990,068.

Conway, Richard J.: *See—*
Rizzo, Dominick; and Conway, Richard J., 3,989,123.

Cook, Eric Norman: *See—*
Yeomans, David Robert; and Cook, Eric Norman, 3,989,318.

Coomber, Allen J. Model aircraft incidence gauge. 3,988,839, Cl. 33-371.000.

Cooper, Duane H.; Takagi, Toshihiko; and Kamo, Yoshihisa. Multidirectional sound signal recording and/or reproducing system with crosstalk compensation means. 3,989,903, Cl. 179-100.4ST.

Cooper, Julius, to Ideal Toy Corporation. Battle board game apparatus. 3,989,254, Cl. 273-131.00B.

Cooper, Martin H., to Westinghouse Electric Corporation. Method for determining the concentration of fission products in a reactor coolant. 3,989,945, Cl. 250-304.000.

Cordon, Martin; and Norfleet, James, to Colgate-Palmolive Company. Calcium pyrophosphate abrasive system for dentifrice. 3,989,814, Cl. 424-57.000.

Cornell, Conrad F.: *See—*
Dahlstrom, Donald A.; and Cornell, Conrad F., 3,989,464.

Corning Glass Works: *See—*
Rittler, Hermann L., 3,989,496.

Cornwell, Charles E.: *See—*
Plunguian, Mark; and Cornwell, Charles E., 3,989,534.

Corometrics Medical Systems, Inc.: *See—*
Hojaiban, George, 3,989,034.

Costes, Didier: *See—*
Aubert, Gilles; Barras, Gilles; and Costes, Didier, 3,989,290.

Cotton, Dale L., to General Motors Corporation. Method of applying a laminated insulating film to copper wire. 3,989,561, Cl. 156-54.000.

Cottrell, Edward D., to Champion International Corporation. Film driving mechanism for high inertia storage rolls. 3,989,201, Cl. 242-55.000.

Coughran, Samuel J., Jr., to Rome Industries. Tree harvester. 3,989,075, Cl. 144-34.00R.

Coulter Electronics, Inc.: *See—*
Fulwyler, Mack J., 3,989,381.

Courson, Iber C.; and Kraft, Joseph K., to Westinghouse Electric Corporation. Transportation apparatus. 3,989,133, Cl. 198-335.000.

Cowpland, Michael C. J., to Mitel Canada Limited. Alternating current regulator for use with telephone type line. 3,989,902, Cl. 179-81.00R.

Cox, James P., to Walker, H. Gordon. Method of odor control. 3,989,498, Cl. 71-3.000.

Cox, Ronald E., to Bendix Corporation, The. Command bar mechanism for flight director indicator. 3,988,927, Cl. 73-178.00R.

Cox, Sidney R., to Associated Rubber Company. Quick release adjustable clamp for retaining insert in cylindrical container. 3,989,428, Cl. 425-18.000.

CPC International Inc.: *See—*
Milkovich, Ralph; and Chiang, Mutong T., 3,989,768.

Crabtree, Alfred A.; Prodger, Brian S.; and O'Connor, Hubert P., to Hasbro Development Corporation. Posable figure having one piece connector for torso, trunk and legs. 3,988,855, Cl. 46-161.000.

Craddock, John H.; Roth, James F.; Hershman, Arnold; and Paulik, Frank E., to Monsanto Company. Production of propionic acid. 3,989,747, Cl. 260-533.0AN.

Craddock, John H.: *See—*
Paulik, Frank E.; Hershman, Arnold; Roth, James F.; and Craddock, John H., 3,989,748.

Cragoe, Edward J., Jr.; and Jones, James H., to Merck & Co., Inc. 11,12-Secoprostaglandins. 3,989,749, Cl. 260-534.00M.

Craig, Dwin R. Automatic focussing attachment for photographic enlargers. 3,989,373, Cl. 355-56.000.

Crandall, Robert E., to Envirex Inc. Removable gas diffuser and apparatus therefor. 3,989,627, Cl. 210-220.000.

Crane, Walton B., to A & E Plastik Pak Co., Inc. Apparatus for unitizing stacked product containers for shipment. 3,989,140, Cl. 206-386.000.

Crase, Gary M.: *See—*
Tschirky, John E.; and Crase, Gary M., 3,989,114.

Crees, Silas Ray, to Manufacturing Research Corporation. Cable bender. 3,988,918, Cl. 72-458.000.

Cresswell, Michael W.; and Roberts, John S., to Westinghouse Electric Corporation. Low forward voltage drop thyristor. 3,990,091, Cl. 357-38.000.

Crnojevich, Ranko P.: *See—*
Chou, Eddie C.; Crnojevich, Ranko P.; and Koehler, Harold, 3,989,509.

Crockett, William B.; and Mueller, Otward, to General Electric Company. Power amplifier having protective circuits. 3,990,019, Cl. 330-207.00P.

Crosby, William E., to Westvaco Corporation. Method and apparatus for leveling the cross-direction profile of stock slurry on a papermachine. 3,989,085, Cl. 162-198.000.

Crowther, Joseph C., Jr.: *See—*
Skocypec, Russell; Crowther, Joseph C., Jr.; and Cimaroli, Richard J., 3,989,461.

Cullen, Roy H.; and Young, David E. Electrical kelly cock assembly. 3,989,330, Cl. 339-16.00R.

Culver, Martin J.; and Stopper, Howard R., to Drackett Company, The. Corrosion inhibitor composition. 3,989,640, Cl. 252-364.000.

Cunningham, Thomas H. M., to Garrett Corporation, The. Wheel containment apparatus and method. 3,989,407, Cl. 415-1.000.

Cycowicz, Izchak; and Frimmet, Alfred, to Mohasco Corporation. Seating furniture and hardware therefor. 3,989,298, Cl. 297-342.000.

Czurak, Richard H.; and Thompson, Robert M., to O. M. Scott & Sons Company. Apparatus for the production of foamed fertilizers. 3,989,470, Cl. 23-259.300.

da Costa, Harry H.; and Krichbaum, Paul L., to Motorola, Inc. Apparatus for measuring the concentricity of rotors of miniature motors with respect to their axial pivots. 3,988,836, Cl. 33-174.00Q.

Daeuble, Manfred: *See—*
Vescia, Michele; Daeuble, Manfred; and Widder, Rudi, 3,989,456.

Dahlstrom, Donald A.; and Cornell, Conrad F., to Envirotech Corporation. Sulfur dioxide scrubbing system. 3,989,464, Cl. 23-260.000.

Dai Nippon Toryo Kabushiki Kaisha: *See—*
Yaguchi, Mashachika; and Nakamura, Kenji, 3,989,639.

Dailey, Charles R., to General Tire & Rubber Company, The. Tire mold having nails inserted in the vents. 3,989,430, Cl. 425-28.00R.

Daimler-Benz Aktiengesellschaft: *See—*
Abthoff, Jorg; Huttebraucker, Dag-Harald; and Loose, Gunter, 3,988,890.
Haberle, Fritz; and Riechers, Daniel, 3,989,293.

Dainippon Ink & Chemicals, Incorporated: *See—*
Homma, Minoru; Shoji, Akio; and Nakamura, Hidehisa, 3,989,767.

Daiwa Boseki Kabushiki Kaisha: *See—*
Miyazaki, Tsutomu; Kato, Takashi; Suzuki, Yoshihisa; and Ueda, Shozo, 3,988,880.

Dancy, Edna A.: *See—*
Fey, Maurice G.; and Dancy, Edna A., 3,989,511.

Daniels, George D.; and Malley, Arnold T. Assembly stand for assembling crank shafts. 3,988,821, Cl. 29-283.000.

Dardik, Herbert: *See—*
Dardik, Irving I.; and Dardik, Herbert, 3,988,782.

Dardik, Irving I.; and Dardik, Herbert. Non-antigenic, non-thrombogenic infection-resistant grafts from umbilical cord vessels and process for preparing and using same. 3,988,782, Cl. 3-1.000.

Data General Corporation: *See—*
Gruner, Ronald Hans, 3,990,052.

Davidge, Ronald V.; James, Dorris D.; and Johnson, Frederick W., to International Business Machines Corporation. Photoconductor cleaning stations. 3,989,372, Cl. 355-15.000.

Davies, John R.; and Platteschorre, Kornelis, to Oliver Machinery Company. Split labeling apparatus. 3,989,575, Cl. 156-355.000.

Davies, Richard B., to Kendall Company, The. Motion limiting supportive device. 3,989,041, Cl. 128-166.000.

Davis, Clifford A.: *See—*
Poe, L. Richard; Davis, Clifford A.; and Bourne, William R., Jr., 3,988,808.

Davy Powergas GmbH: *See—*
Stauffer, Adolf, 3,989,809.

Dayton, David R.: *See—*
Cangiano, Frank; Reed, Stephen A., III; Boule, Wilfred L.; and Dayton, David R., 3,989,549.

de Lorme Marketing Corporation: *See—*
Brookhart, Rex D., 3,989,789.

Debrey, Robert J. Particle monitoring apparatus. 3,989,311, Cl. 302-65.000.

Decker, Gerd: *See—*
Brandstetter, Walter; Decker, Gerd; and Reichel, Kurt, 3,989,014.

Decoteau, Gary D.: *See—*
Bosley, Roy E.; Mann, Paul T.; Decoteau, Gary D.; Ivie, Kert F.; and Winslow, Elden D., 3,988,953.

De Graw, Joseph I.: *See—*
Barrett, M. James; and De Graw, Joseph I., 3,989,812.

Deguchi, Nobuaki, to Hitachi Metals, Ltd. Hollow core molding device for use in shell mold. 3,989,089, Cl. 164-201.000.

De Haes, Louis Maria; Vandeputte, Camille Angelina; and Vermeulen, Leon Louis, to AGFA-GEVAERT N.V. Production of planographic printing patterns on aluminum sheets using solutions containing dicarboxylic acid compounds. 3,989,521, Cl. 96-29.00L.

De Kruif, Jan H.: *See—*
Sluis, Maarten; and De Kruif, Jan H., 3,989,679.

Del-Met Corporation: *See—*
Buerger, Herbert, 3,989,306.

Delbouille, Andre: *See—*
Berger, Eugene; Delbouille, Andre; Gerard, Pol; and Derroitte, Jean-Louis, 3,989,879.
Berger, Eugene; Gerard, Pol; Delbouille, Andre; and Derroitte, Jean-Louis, 3,989,880.

De Long, David C. Stadium riser backless seat, support and armrest. 3,989,299, Cl. 297-411.000.

Delvos, Hermann-Josef: *See—*
Kompe, Dieter; and Delvos, Hermann-Josef, 3,989,007.

DeMario, Edmond E.: *See—*
Wehrli, Henry A., III; DeMario, Edmond E.; and Hovanec, Thomas R., 3,989,590.

Demi, Roy C.: *See—*
Branson, Charles D.; and Demi, Roy C., 3,989,064.

Demole, Edouard, to Firmenich S.A. Flavoring phenol or phenol derivative containing food or feed with cycloaliphatic derivatives. 3,989,857, Cl. 426-536.000.

DeMonbrun, James R.; Schmitt, Charles R.; and Williams, Everett H., to United States of America, Energy Research and Development Administration. Flotation process for removal of precipitates from electrochemical chromate reduction unit. 3,989,608, Cl. 204-149.000.

Dennison Manufacturing Company: *See—*
Brack, Karl, 3,989,609.

Depka, Charles W., to Modern Builders Supply Co. Means for slumping cement blocks. 3,989,432, Cl. 425-139.000.

Derroitte, Jean-Louis: *See—*
Berger, Eugene; Delbouille, Andre; Gerard, Pol; and Derroitte, Jean-Louis, 3,989,879.
Berger, Eugene; Gerard, Pol; Delbouille, Andre; and Derroitte, Jean-Louis, 3,989,880.

Dettling, Hubert: *See—*
Adalbert, Gerhard; Dettling, Hubert; and Hess, Jurgen, 3,989,490.

DeVito, Charles P., to Chromalloy-Alcon, Inc. Spring binding post. 3,989,345, Cl. 339-254.00R.

Dia Medical System Co., Ltd.: *See—*
Sasamori, Soichiro, 3,989,036.

Diassi, Patrick A.: *See—*
Stiller, Eric T.; Levine, Seymour D.; Principe, Pacifico A.; and Diassi, Patrick A., 3,989,841.

Dibner, Andrew S., to Lifeline Systems, Inc. Automatic telephone alarm system. 3,989,900, Cl. 179-5.00P.

Dickinson, George Alfred; and Rhodes, William Jackson, to Pilkington Brothers Limited. Glass melting. 3,989,497, Cl. 65-135.000.

Di Costanzo, Francois. Compositions for combating nicotinism in man. 3,989,823, Cl. 424-195.000.

Diesel Kiki Co., Ltd.: *See—*
Kobayashi, Masayoshi; and Yuzawa, Yasutaka, 3,989,021.

Digneffe, Henri Joseph, to RCA Corporation. Alternating current control system. 3,990,000, Cl. 323-24.000.

Dilanni, Daniel: *See—*
Brackmann, Warren A.; and Dilanni, Daniel, 3,989,052.

Dill, Frederick H.; and Hoekstra, Jan P., to International Business Machines Corporation. Part locating, mask alignment and mask alignment verification system. 3,989,385, Cl. 356-152.000.

Dimeff, John. Automatic flow control and automatic shut off for intravenous feeders. 3,989,043, Cl. 128-214.00C.

Dimon, Donald. Asynchronous demodulator. 3,990,016, Cl. 329-135.000.

Dirks, Arthur A. Portable and powerably actuatable pipe wrench. 3,988,952, Cl. 81-126.000.

Disteldorf, Josef: *See—*
Schmitt, Karl; Disteldorf, Josef; and Flakus, Werner, 3,989,662.

Divo, Claudio: *See—*
Calcagno, Benedetto; Divo, Claudio; and Ghirga, Marcello, 3,989,742.

Dixon, Leonard Fox; Hinchcliffe, Bryan Ronald; and Vellins, Cyril Eric, to L. B. Holliday & Co. Limited. Dyestuff compositions. 3,989,449, Cl. 8-25.000.

Dobos, Gyorgy; Felfoldi, Zoltan; Horvath, Gyula; Kaptay, Gyorgy; Osvald, Zoltan; and Solymar, Karoly, to Magyar Aluminiumipari Troszt. Method for the treatment of red mud. 3,989,513, Cl. 75-30.000.

Dolfini, Joseph Edward, to E. R. Squibb & Sons, Inc. 7-Methoxy cyclonexadienylureidocephalosporins. 3,989,693, Cl. 260-243.00C.

Dolfini, Joseph Edward, to E. R. Squibb & Sons, Inc. 7-Methoxy phenylureidocephalosporins. 3,989,697, Cl. 260-243.00C.
Domba, Elmer, to Naico Chemical Company. Polymeric composition with chelating properties. 3,989,636, Cl. 252-180.000.
Dominion Glass Company Limited: *See—*
Spitz, Tibor, 3,989,380.
Donohue, John R. Side panels and loading ramp for pickup truck. 3,989,148, Cl. 214-85.000.
Donovan, James, to Artisan Industries Inc. Apparatus and system for stabilizing the disc elements of a rotary concentrator for solids-containing fluids. 3,989,629, Cl. 210-298.000.
Doppelt, Lawrence, to Goldberger Doll Mfg. Co., Inc. Toy musical cradle. 3,988,856, Cl. 46-175.00R.
Dorma-Baubeschlag GmbH & Co. KG: *See—*
Cleff, Herbert, 3,989,286.
Dorr-Oliver Incorporated: *See—*
Bier, Thomas H., 3,989,628.
Dostal, Jaroslav: *See—*
Hrdina, Karel; Dostal, Jaroslav; and Borovec, Vaclav, 3,989,069.
Dougherty, John J., to APF Corporation. Pile joiner for connecting the ends of concrete piles and its members. 3,988,899, Cl. 61-53.000.
Doundoulakis, George J., to Casey, William J.; and Doundoulakis, Helias, part interest to each. Three-rotor engine. 3,989,012, Cl. 123-8.470.
Doundoulakis, Helias: *See—*
Doundoulakis, George J., 3,989,012.
Dow Chemical Company, The: *See—*
Bashaw, Robert N.; Atkins, Bobby L.; and Gross, James R., 3,989,586.
Boozalis, Theodore S.; Ivy, John B.; and Willis, Gordon G., 3,989,601.
Bridge, William A., 3,989,785.
Gritzner, Gerhard, 3,989,613.
McKendry, Lennon H., 3,989,507.
Olstowski, Franciszek, 3,989,663.
Taylor, Otis C.; and Lemaster, Lee A., 3,989,675.
Dow Corning Corporation: *See—*
Lee, Chi-Long; and Marko, Ollie W., 3,989,667.
Lee, Chi-Long; and Ronk, Gary M., 3,989,668.
Niemi, Randolph G., 3,989,666.
Downing, Robert D., to General Electric Company. Metal halide high-intensity discharge lamp having improved restart capability. 3,989,970, Cl. 313-42.000.
Drackett Company, The: *See—*
Culver, Martin J.; and Stopper, Howard R., 3,989,640.
Dresser Industries, Inc.: *See—*
Ambrose, Albert Robin, 3,989,115.
Arrington, Thomas Lonnie, 3,989,302.
Kunderman, Fred Kurt, 3,989,258.
Parker, Curtis Jess; and McGill, Kenneth Harmon, 3,989,419.
Drumheller, Warren D.: *See—*
Schmitz, Lawrence S.; and Drumheller, Warren D., 3,990,075.
DSO "ZMM": *See—*
Zonkov, Simeon Dontchev; Zarvenkov, Alexander Yordanov; Tchobanov, Konstantin Kirilov; and Baliev, Nikolay Vassilev, 3,989,260.
Dubois, Jean Claude; Gazard, Maryse; and Zann, Annie, to Thomson-CSF. Nematic liquid crystal of homeotropically aligned type and a method of manufacturing said device. 3,989,354, Cl. 350-160.0LC.
Dubois, Robert D.: *See—*
United States of America, National Aeronautics and Space Administration; Dubois, Robert D.; and Pinson, George T., 3,989,136.
Ducane Heating Corporation: *See—*
Berger, Bernard B., 3,989,028.
Duchet, Michel, to Compagnie Generale d'Electricite. Optical device. 3,989,360, Cl. 350-319.000.
Dudley, Michael Alan: *See—*
Bayles, Francis Derrick; and Dudley, Michael Alan, 3,989,875.
Dugan, Thomas J.; and Spencer, Ross M. Remote monitor signalling system. 3,989,898, Cl. 179-2.0AM.
Duigon, Ferdinand Carl; and Liu, Shing-gong, to RCA Corporation. Planar Trapatt diode. 3,990,099, Cl. 357-13.000.
Dumas, David H.: *See—*
Aldrich, Paul H.; and Dumas, David H., 3,989,659.
Dunigan, Thomas E.; and Sisco, George C., to United States of America, Army. Process for preparing double base propellants containing ballistic modifier. 3,989,776, Cl. 264-3.00B.
Dunlop Limited: *See—*
Tippin, Arthur David, 3,989,791.
Du Pont de Nemours, E. I., and Company: *See—*
Estes, Leland Lloyd, Jr.; Fridrichsen, Anton Fridrich; and Koshkin, Victor Simeon, 3,989,788.
Kuratle, Henry, III, 3,989,501.
Mastrangelo, Sebastian Vito Rocco, 3,990,098.
Sze, Benjamin Chiatse, 3,988,883.
DuPuis, Clyde F.: *See—*
Shaw, Fred B.; and DuPuis, Clyde F., 3,989,165.
Duttweiler, Donald Lars, to Bell Telephone Laboratories, Incorporated. Digital signal processing arrangement using a cascaded integrator function generator. 3,990,073, Cl. 340-347.0AD.
Dutzler, Wilhelm: *See—*
Peitl, Josef; Granitz, Fritz; Reithner, Gerhard; Dutzler, Wilhelm; Muller, Heinz; Bachner, Ernst; and Fortner, Walter, 3,989,093.
Dworschak, Karl: *See—*
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Dyer, Curtis P., to Lawrence Peska Associates, Inc., a part interest. Golf ball retriever. 3,989,151, Cl. 214-353.000.
E. R. Squibb & Sons, Inc.: *See—*
Breuer, Hermann; and Treuner, Uwe D., 3,989,696.
Dolfini, Joseph Edward, 3,989,693.
Dolfini, Joseph Edward, 3,989,697.
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Cole, Carroll R.; and Easterling, Gene B., 3,989,112.
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Bissonette, Vernon Leon, 3,989,526.
Gysling, Henry J., 3,989,732.
Locker, David J., 3,989,527.
Smith, David S., 3,989,377.
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Bojas, Edward J.; and Ward, Harold R., 3,988,893.
Ecodyne Limited: *See—*
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Edahiro, Kenichi: *See—*
Kiga, Shotaro; Chiba, Shozo; Edahiro, Kenichi; Yoshida, Naoshi; and Nagasawa, Masuo, 3,989,615.
Edstrom, Lennart; and Uddin, Kent, to AB Elektronik-Konstruktioner. Device for measuring and/or monitoring the flow velocity of a flowing fluid. 3,988,928, Cl. 73-204.000.
Edwards, Michael L.: *See—*
Bambury, Ronald E.; Edwards, Michael L.; and Miller, Laird F., 3,989,687.
Edwin, Allan I.: *See—*
Katz, Harold W.; Venturi, Gino; Bennett, Melvin T.; and Edwin, Allan I., 3,990,046.
Egan, James J.; Strohl, Ronald I.; and Wanesky, William R., to Western Electric Company, Inc. Method of holding articles. 3,989,566, Cl. 156-155.000.
Egnaczak, Raymond K.: *See—*
Teumer, Roger G.; Warter, Peter J., Jr.; Squassoni, Gino F.; Tulagin, Vsevolod; and Egnaczak, Raymond K., 3,989,366.
Ehemann, Horst: *See—*
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Ehrfeld, Wolfgang: *See—*
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Ehrhardt, Orville W.: *See—*
Cayen, Donald J.; Ehrhardt, Orville W.; and Fatke, Richard V., 3,988,965.
Eickhorst, Manfred. Apparatus for the spectroscopical examination of light transmitting objects such as precious stones. 3,989,379, Cl. 356-30.000.
Einstman, William J.: *See—*
Erb, William W.; Einstman, William J.; Jones, Gary V.; and McGregor, George A., 3,989,850.
Eisema, Hendrik, to U.S. Philips Corporation. Reproducing apparatus with drop out suppression circuit for audio and video signals. 3,989,893, Cl. 178-6.6DC.
Eisenbeiss, Gerd: *See—*
Becker, Erwin Willi; Ehrfeld, Wolfgang; and Eisenbeiss, Gerd, 3,989,483.
Eisenkopf, Hermann: *See—*
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Electro-Craft Corporation: *See—*
Schmidt, Robert H., 3,989,992.
Electrovert Manufacturing Company, Limited: *See—*
Tardoskegyi, Louis V., 3,989,180.
Elektroschmelzwerk Kempten GmbH: *See—*
Wiebke, Gunter; Korndorfer, Ludwig; Korndorfer, Eugen; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, 3,989,883.
Elghani, Salah Elabd: *See—*
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Eli Lilly and Company: *See—*
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Brannon, Donald R.; and Neuss, Norbert, 3,989,593.
Hamill, Robert L., 3,989,723.
Lacefield, William B., 3,989,831.
Miesel, John L., 3,989,680.
O'Doherty, George Oliver Plunkett, 3,989,840.
Elkem-Spigerverket A/S: *See—*
Onarheim, Einar, 3,989,918.
Elliott, James Francis, to International Business Machines Corporation. Data storage apparatus employing a flexible magnetic disk. 3,990,111, Cl. 360-99.000.
Ellis, Carl H., to General Motors Corporation. Steering linkage adjust retainer. 3,989,394, Cl. 403-46.000.
Ellis, Daniel B.: *See—*
Swered, Paul; and Ellis, Daniel B., 3,989,585.
Elmiger, Rochus B.; and Beck, Harald, to H. Maihak A.G. Measuring device. 3,988,923, Cl. 73-84.000.
Eltra Corporation: *See—*
Florio, Sam A.; and Sieja, Norman F., 3,989,023.
Elwin, Tore, to AB Bofors. Loading pendulum. 3,988,962, Cl. 89-46.000.

Emerson Electric Co.: *See*—
Baysinger, Robert L., 3,989,486.
Brandenstein, Zane G., 3,989,129.

Emery, Reginald John. Jamming cleat for releasably holding ropes cords, cables and similar elongate articles. 3,988,810, Cl. 24-128.00R.

Emmi, Salvatore: *See*—
Viro, Felix; and Emmi, Salvatore, 3,989,529.

Emmons, William D., to Rohm and Haas Company. Novel difunctional compounds as latent diisocyanates. 3,989,752, Cl. 260-561.00H.

Enderle, Heinrich; and Jabs, Alfred, to Motoren- und Turbinen-Union Munchen GmbH M.A.N. Maybach Mercedes-Benz. Device for varying the gas exit area of an exhaust nozzle for a jet deflecting device. 3,989,192, Cl. 239-265.350.

Engel, Niels N.; and Anderson, Eugene A. Coated steel product and process of producing the same. 3,988,955, Cl. 83-661.000.

England, Will Clarke. Reversible mechanical-thermal energy cell. 3,988,905, Cl. 62-401.000.

Englehart, Paul G. Mechanical control for fogging systems. 3,989,190, Cl. 239-70.000.

English Clays Lovering Pochin & Company Limited: *See*—
Falcon-Steward, Hugh Robin, 3,989,195.

Enokido, Nobuo: *See*—
Yamaguchi, Kazuo; Kanoh, Natsuki; Tanaka, Toru; Enokido, Nobuo; Murakami, Atsushi; and Yoshida, Seiji, 3,989,881.

Envirex Inc.: *See*—
Crandall, Robert E., 3,989,627.

Envirotech Corporation: *See*—
Dahlstrom, Donald A.; and Cornell, Conrad F., 3,989,464.

Eocom Corporation: *See*—
Auth, Gerald L., 3,989,938.

Epis, James J., to GTE Sylvania Incorporated. Log-periodic longitudinal slot antenna array excited by a waveguide with a conductive ridge. 3,990,079, Cl. 343-771.000.

Epkro Plastics, Inc.: *See*—
Kroeker, Gerald H., 3,989,224.

Erb, Georg Otto. Electric heater utilizing a pourable heat storage bulk. 3,989,927, Cl. 219-378.000.

Erb, William W.; Einstman, William J.; Jones, Gary V.; and McGregor, George A., to General Foods Corporation. Decaffeination process. 3,989,850, Cl. 426-242.000.

Eriksson, Bjorn Sven Hilding: *See*—
Lindelov, Ernst Claes Goran; and Eriksson, Bjorn Sven Hilding, 3,988,984.

Ernsthausen, Roger E., to Owens-Illinois, Inc. Gas discharge device having improved operating characteristics. 3,989,877, Cl. 428-539.000.

Escamilla, Gus, to Raymond Lee Organization, Inc., The, a part interest. Drum pedal assembly. 3,988,957, Cl. 84-422.00R.

Eschenmoser, Albert: *See*—
Stadler, Paul A.; Eschenmoser, Albert; and Sundt, Erling, 3,989,739.

Eschler, Hans, to Siemens Aktiengesellschaft. Acousto-optical data input transducer with optical data storage and process for operation thereof. 3,989,347, Cl. 350-3.500.

Eskridge, Brewster B.; and Lyon, Boyce M., to Akzona Incorporated. Antisoiling carpet having triangular polyamide pile containing polystyrene fibrils. 3,989,866, Cl. 428-92.000.

Espy, Ronald E.: *See*—
Goller, George N.; and Espy, Ronald E., 3,989,474.

Estebanez, Joseph; and Linfield, Peter M., to Shell Oil Company. Apparatus for spraying an insulating foam on an inside wall of a tank. 3,989,006, Cl. 118-306.000.

Ester, Wilhelm, to Veba-Chemie AG. Process for the manufacture of alcohols by the hydration of olefins. 3,989,762, Cl. 260-641.000.

Estes, Leland Lloyd, Jr.; Fridrichsen, Anton Fridrich; and Koshkin, Victor Simeon, to Du Pont de Nemours, E. I., and Company. Method of making a bonded non-woven web. 3,989,788, Cl. 264-120.000.

Estradier, Francoise: *See*—
Kalopissis, Gregoire; Bugaut, Andree; Estradier, Francoise; Ghilardi, Giuliana; Grollier, Jean-Francois; and Bore, Pierre, 3,989,447.

Estrella, Kenneth A.: *See*—
Sauseng, Otto; and Estrella, Kenneth A., 3,989,978.

Etkins, Robert: *See*—
Lesster, Laban E.; and Etkins, Robert, 3,989,951.

Ettenberg, Michael; and Kressel, Henry, to RCA Corporation. Solar cell device having two heterojunctions. 3,990,101, Cl. 357-30.000.

Eue, Ludwig: *See*—
Sasse, Klaus; Beck, Gunther; and Eue, Ludwig, 3,989,710.

Evans, Bob O., to International Business Machines Corporation. Stored program selector for electronic calculator. 3,990,053, Cl. 340-172.500.

Evans Products Company: *See*—
Sheldon, Gary L., 3,989,579.

Evans, Thomas S., to Sturtevant Industries, Inc. Automatic label applying apparatus. 3,989,574, Cl. 156-351.000.

Evers, William J.; Heinsohn, Howard H., Jr.; and Giacino, Christopher, to International Flavors & Fragrances Inc. 3-Furyl beta-oxoalkyl sulfides and methods for using same for altering, modifying or enhancing the organoleptic properties of foodstuffs. 3,989,856, Cl. 426-535.000.

Ewing, Roy D., to United States Steel Corporation. Drive and control mechanism for electrically operated reciprocating apparatus. 3,989,993, Cl. 318-282.000.

Exxon Production Research Company: *See*—
Burkhardt, Joseph A.; Childers, Thomas W.; and Koerner, Roger J., 3,989,223.

Exxon Research and Engineering Company: *See*—
Berman, Elliot, 3,989,980.
Clark, William Donald Kennedy, 3,989,542.
Greene, David F.; Lang, Robert J.; and Welty, Albert B., Jr., 3,989,798.
Long, Fred M.; and Sawyer, Willard H., 3,989,645.
Merchant, Philip, Jr.; Ohaji, Cosmas O.; and Powell, F. Luther, 3,989,460.
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Fabrica Espanola Magnetos, S.A.: *See*—
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Fachbach, Heinz: *See*—
Thien, Gerhard; and Fachbach, Heinz, 3,988,948.

Fagan, John C.; and Bania, Robert M., to Sippican Corporation, The. Paint spray control system. 3,989,003, Cl. 118-2.000.

Fahey, Michael D., to United Air Lines. Pulsed arc welding apparatus. 3,989,922, Cl. 219-131.00R.

Fahey, William David; Lotz, Robert Wayne; and Newhard, Jack Wendel, to Singer Company, The. Symbol recognition enhancing apparatus. 3,990,044, Cl. 340-146.30H.

Fairfield Engineering Company, The: *See*—
Gorenflo, Donald L.; Hendershot, Dick D.; and Ridenour, Oscar E., 3,989,094.

Falcon-Steward, Hugh Robin, to English Clays Lovering Pochin & Company Limited. Production of aqueous calcium carbonate suspensions. 3,989,195, Cl. 241-16.000.

Farley, James R.; Salvati, John G.; and Ricci, Louis N., to Westinghouse Electric Corporation. Metal enclosed switchgear having wellshaped front covers. 3,989,986, Cl. 317-120.000.

Farnum, Henry Merritt. Circumferential stereo spectacular, 360 degrees horizontally and vertically with mosaic in scene. 3,989,362, Cl. 352-69.000.

Farrington, Gregory C.: *See*—
Roth, Walter L.; and Farrington, Gregory C., 3,989,538.

Farrow, Stephen E.: *See*—
Lofgren, Lewis C.; and Farrow, Stephen E., 3,989,040.

Fasano, Osvaldo, to Start S.p.A. Studi Apparecchiature e Ricerche Tecniche. Control lever system, particularly for vehicle brakes. 3,988,945, Cl. 74-512.000.

Fassbender, Rolf: *See*—
Rieber, Roland; and Fassbender, Rolf, 3,989,414.

Fast, Robert E. Audio-visual convertor. 3,990,105, Cl. 358-82.000.

Fatemi, Mohammad: *See*—
Birks, Laverne S.; and Fatemi, Mohammad, 3,989,944.

Fatke, Richard V.: *See*—
Cayen, Donald J.; Ehrhardt, Orville W.; and Fatke, Richard V., 3,988,965.

Fawn Engineering Co.: *See*—
Wittern, Francis A., 3,989,163.

Fay, Charles Robert, to Formica Corporation. Web penetration control. 3,989,934, Cl. 235-151.100.

Fay, Charles Robert, to Formica Corporation. Method and apparatus for controlling a material treater. 3,989,935, Cl. 235-151.100.

Fay, Charles Robert; Guertin, Alfred Thomas; and Stinson, John William, to Formica Corporation. Method and apparatus for the feed forward control of a material treater. 3,989,936, Cl. 235-151.100.

Fay, Charles Robert; and Richter, James Douglas, to Formica Corporation. Interactive roll gap-reverse roll speed control of the applicator of a material treater. 3,989,937, Cl. 235-151.100.

Fay, Rudolph J., to J. W. Fay & Son, Inc. Apparatus for producing and packaging food chips. 3,988,875, Cl. 53-123.000.

FDI, Inc.: *See*—
Vargo, John W., 3,989,139.

Fedders Corporation: *See*—
Beare, Robert; Harlow, Willis; and Spurgeon, Robert L., 3,988,908.

Federal-Mogul Corporation: *See*—
Lorenz, John J.; and Chandler, Jon A., 3,989,259.

Federal Paper Board Company, Inc.: *See*—
Arneson, Edwin L., 3,989,171.

Feecon Corporation: *See*—
Gagliardo, John P., 3,989,109.

Feintuch, Martin W.; and Kaplan, Mark, to Bendix Corporation, The. Apparatus for guiding an aircraft along a multi-segment path when landing the craft. 3,989,209, Cl. 244-184.000.

Feit, Peter Werner; Nielsen, Ole Bent Tvaermose; and Bruun, Herta, to Lovens Kemiske Fabrik Produktionsaktieselskab. Benzoylbenzoic acid derivatives. 3,989,745, Cl. 260-517.000.

Felfoldi, Zoltan: *See*—
Dobos, Gyorgy; Felfoldi, Zoltan; Horvath, Gyula; Kaptay, Gyorgy; Osvald, Zoltan; and Solymar, Karoly, 3,989,513.

Felten & Guilleaume Carlswerk AG: *See*—
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Fender, Jesse Brian, Jr.: *See*—
Augustine, Paul, Jr.; Fender, Jesse Brian, Jr.; and Hildreth, Donald Laverel, 3,989,245.

Fenoglio, David J.: *See*—
Marchant, Kerford A., Jr.; and Fenoglio, David J., 3,989,669.

Fenton, Leonard. Boat fender. 3,988,997, Cl. 114-219.000.

Ferrari, Bartolomeo Joseph, to General Electric Company. Labyrinth seal system. 3,989,410, Cl. 415-115.000.

Feuillade, Georges; Chenaux, Bernard; and Perche, Philippe, to Compagnie Generale d'Electricite. Method for preparing electrochemical elements in thin layers. 3,989,540, Cl. 29-623.100.

Fex, Hans: *See—*
Hogberg, Bertil; Fex, Hans; Perklev, Torsten; Veige, Sten; and Fredholm, Bo, 3,989,825.

Fey, Maurice G.; and Dancy, Edna A., to Westinghouse Electric Corporation. Metal powder production by direct reduction in an arc heater. 3,989,511, Cl. 75-.5BB.

Feyns, Liviu Valentin: *See—*
Niculescu-Duvaz, Ion; Feyns, Liviu Valentin; Suster, Dan; and Ciustea, Gheorghe, 3,989,703.

Fiat Societa per Azioni: *See—*
Giaccardi, Eraldo, 3,989,963.

Field, Brian Orlando; and Sanyal, Dilip Kumar, to City University, The. Metal nitrito compounds. 3,989,801, Cl. 423-385.000.

Finch, Peter Molyneux; Goff, Robert William; and Sykes, Christopher John, to British Leyland UK Limited. Interior energy absorbing means for vehicles. 3,989,275, Cl. 280-751.000.

Fink, Raymond: *See—*
Pelosi, Michael E., Jr.; and Fink, Raymond, 3,989,491.

Finn, John E.: *See—*
Hanson, Violet M.; and Finn, John E., 3,988,970.

Finsterwalder, Ulrich. Container for liquefied gas. 3,988,995, Cl. 114-74.00A.

Firestone Tire & Rubber Company, The: *See—*
Bank, Thomas A.; Gieck, Jack E.; and Weitzenhof, David A., 3,989,292.
Lohr, Delmar F., Jr.; and Kay, Edward Leo, 3,989,657.
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Firmenich & Cie: *See—*
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Firmenich S.A.: *See—*
Demole, Edouard, 3,989,857.
Stadler, Paul A.; Eschenmoser, Albert; and Sundt, Erling, 3,989,739.

Fischer, Adolf, to BASF Aktiengesellschaft. Substituted nitroanilines and ureas as herbicidal mixtures. 3,989,508, Cl. 71-120.000.

Fischer, Allen H.; and Schwarz, John S., to International Telephone and Telegraph Corporation. Chambered arc snuffing tube for bushing assembly. 3,989,342, Cl. 339-111.000.

Fischer, Caecilia Emma, to BASF Aktiengesellschaft. Herbicide mixtures. 3,989,506, Cl. 71-91.000.

Fischer, Dieter, to Battelle-Institut e.V. Storage element for a digital permanent storage (memory system). 3,989,953, Cl. 307-88.0ET.

Fischer, Paul W.; Pye, David S.; and Gallus, Julius P., to Union Oil Company of California. Method of conducting drilling operations. 3,989,632, Cl. 252-8.50A.

Fischer, Winfried: *See—*
Prinz, Richard; Elghani, Salah Elabd; Fischer, Winfried; and Alberts, Heinrich, 3,989,770.

Fish, David H.; Knodel, Charles H.; Keen, Harry J.; and Barrett, Paul, to Colt Industries Operating Corporation. Vehicle weighing system. 3,990,032, Cl. 338-5.000.

Fisher, Charles B.: *See—*
Fisher, Sidney T.; and Fisher, Charles B., 3,989,107.

Fisher, Gene J.: *See—*
Broussard, Jerry A.; and Fisher, Gene J., 3,989,740.

Fisher, Sidney T.; and Fisher, Charles B. Induction heating of underground hydrocarbon deposits. 3,989,107, Cl. 166-248.000.

Fitzmayer, Louis H.; and Hornung, Richard E., to General Electric Company. Microwave oven food temperature-sensing probe. 3,988,930, Cl. 73-352.000.

Fives-Cail Babcock: *See—*
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Flakus, Werner: *See—*
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Flament, Ivon: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 3,989,713.

Fleming, James William, Jr.: *See—*
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Flick, Francis S.: *See—*
Peters, Walter C.; Ghislain, Raymond L.; and Flick, Francis S., 3,988,968.

Flick, Joseph J., to Bivins, Oliver W., a part interest. Beverage can folder. 3,988,978, Cl. 100-35.000.

Florent, Jean; Lunel, Jean; and Mancy, Denise, to Rhone-Poulenc Industries. Anticoccidial substance and its preparation. 3,989,820, Cl. 424-122.

Florian, John, to Mobil Oil Corporation. Self-draining saucer. 3,989,158, Cl. 220-23.830.

Florio, Sam A.; and Sieja, Norman F., to Eltra Corporation. Triggering rotor and sensor assembly. 3,989,023, Cl. 123-146.50A.

Fluidtech Corporation: *See—*
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Fogel, Harvey P.; and Holzberg, Irving, to General Foods Corporation. Improving the flavor of decaffeinated coffee by radio frequency heating to rapidly dry coffee beans. 3,989,849, Cl. 426-242.000.

Foley, John D., Jr., to Ram-Glas Products, Inc. Outboard motor electric steering control. 3,989,000, Cl. 115-18.00E.

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Franco, Daniel. Rotary valve. 3,989,025, Cl. 123-190.0BE.

Franetzki, Manfred, to Siemens Aktiengesellschaft. Flow measuring device. 3,989,037, Cl. 128-2.080.

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Friedl, Reiner; Dworschak, Karl; and Hornfeck, Werner, to Webastowerk W. Baier KG. Liquid fuel burning heater for vehicles. 3,989,029, Cl. 126-110.00B.

Friedl, Reiner, to Webasto-Werk W. Baier KG. Liquid fuel burning heater unit. 3,989,030, Cl. 126-110.00R.

Friedman, Eugene M., to United States of America, Army. System for measuring small angular motions. 3,989,384, Cl. 356-152.000.

Friedman, Jack J. Adjustable wire entrance hanger for a traffic signal. 3,989,217, Cl. 248-327.000.

Friedrich, Jurgen; Friesenhagen, Engelbert; and Rasquin, Werner, to Felten & Guilleaume Carlswerk AG. Internally cooled high-energy cable and a method of manufacturing same. 3,989,884, Cl. 174-15.00C.

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Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, to Rhone-Poulenc-Textile. Method and apparatus for simultaneously texturizing and cutting continuous yarns. 3,988,882, Cl. 57-140.00R.

Guise, Geoffrey Bruce, to Commonwealth Scientific and Industrial Research Organization. Compositions containing bisulphite adducts of polyisocyanates and method of use. 3,989,458, Cl. 8-192.000.

Guldberg, Jens: *See*—
Nathanson, Harvey C.; Guldberg, Jens; and Muss, Daniel R., 3,989,890.

Gundlach, Arnold, to Franz Kuhlmann KG. Column drawing table. 3,989,211, Cl. 248-162.000.

Gunschmann, Peter, to Robert Bosch Fernsehanlagen G.m.b.H. Tape guiding device for a magnetic instrument. 3,990,110, Cl. 360-84.000.

Gustafsson, Berth Ulrik, to Projectus Industripdukter AB. Method and apparatus employing a heat pump for heating fluids in different flow circuits. 3,989,183, Cl. 237-2.00B.

Gutman, Abraham: *See*—
Labie, Allan S.; Lew, Irwin Paul; Thornton, Charles H.; and Gutman, Abraham, 3,988,868.

Guttinger, Heinrich, to Aginfor AG Fur Industrielle Forschung. Displacement machine for compressible media. 3,989,422, Cl. 418-55.000.

Gwilliam, James L., Jr.; and Cameron, Warde Mitchell, Jr., to Plastronics Corporation. Stackable container lid. 3,989,142, Cl. 206-508.000.

Gysling, Henry J., to Eastman Kodak Company. Photosensitive copper (I) complexes. 3,989,732, Cl. 260-438.100.

H. A. Phillips & Co.: *See*—
Ross, Robert R., 3,988,904.

H. Maihak A.G.: *See*—
Elmiger, Rochus B.; and Beck, Harald, 3,988,923.

Haarbye, Fredrik O., to P. R. Mallory & CO., Inc. Method of making silver-cadmium oxide-tin oxide type contact materials. 3,989,516, Cl. 75-173.00A.

Haas, Carl: *See*—
Reiff, Karl H., 3,989,515.

Haas, Rudy M. Method of determination of the total amount of energy transferred by a flowing fluid. 3,988,926, Cl. 73-15.400.

Haberle, Fritz; and Riechers, Daniel, to Daimler-Benz Aktiengesellschaft. Shock absorber mounting in motor vehicles. 3,989,293, Cl. 293-88.000.

Hager, Georg, to ITT Industries, Inc. Magnetic handling equipment. 3,989,164, Cl. 221-212.000.

Haitmanek, Louis F., to Thomas & Betts Corporation. Electrical connector and method of making same. 3,989,339, Cl. 339-97.00C.

Hakamada, Takeshi: *See*—
Kano, Ikushi; Hakamada, Takeshi; Soma, Misao; and Kashimura, Mituo, 3,990,029.

Hakozaki, Hiroshi, to Mitsui Shipbuilding and Engineering Co., Ltd. Pulse control circuit having manually variable output period between pulses. 3,990,014, Cl. 328-42.000.

Hall, William F.: *See*—
Goad, Carl H ; and Hall, William F., 3,988,820.

Halm Instrument Co., Inc.: *See*—
Harrison, Henry, 3,989,032.

Halpern, David Marcos; Sanchez, Eduardo Raul; and Livoff, Arnoldo. Surgical instrument for biopsies. 3,989,033, Cl. 128-2.00B.

Hamark, Karl-Erik Ingemar, to Meat Industry Technique mit Aktiebolag. Apparatus for centering slaughtered carcasses cut open for cleaving. 3,988,803, Cl. 17-23.000.

Hameri, Arthur J. Jack stand. 3,989,276, Cl. 280-763.000.

Hamill, Robert L., to Eli Lilly and Company. Antibiotic A204I derivatives. 3,989,723, Cl. 260-345.700.

Hamisch, Hansjoachim; and Kaiser, Hans-Jurgen, to Robert Bosch G.m.b.H. Information carrier. 3,990,084, Cl. 346-135.000.

Hamrin, Charles E., Jr.; and Weaver, Kenny, to United States of America, Energy Research and Development Administration. Separation of isotopes by cyclical processes. 3,989,484, Cl. 55-58.000.

Hand, John James: *See*—
Spicer, Larry Dean; and Hand, John James, 3,989,835.

Hanlon, Richard J., to Augat, Inc. Dual-in-line socket. 3,989,331, Cl. 339-17.0CF.

Hanma, Kentaro; Masuda, Michio; and Mohri, Katsuo, to Hitachi, Ltd. Circuit for automatically controlling horizontal scanning frequency. 3,990,107, Cl. 360-37.000.

Hans, Waldemar: *See*—
Brouwers, Sytze; Brune, Gerhard; Hans, Waldemar; and Staib, Helmut, 3,989,063.

Hansen, Howard A., to Caterpillar Tractor Co. Battery support with roll out frame. 3,989,118, Cl. 180-68.500.

Hansen Manufacturing Co., The: *See*—
Manning, Bert W.; and Norton, James F., 3,989,160.

Hanson, Violet M.; and Finn, John E., to Hanson, Violet M. Apparatus for forming flat bottom plastic bags. 3,988,970, Cl. 93-14.000.

Hara, Hideo: *See*—
Goto, Hiroshi; Arai, Toshiharu; Sekiguchi, Tadao; and Hara, Hideo, 3,988,972.

Hara, Noboru: *See*—
Toyoda, Sadao; Takenouchi, Kuniyoshi; Ohno, Norihiro; and Hara, Noboru, 3,989,635.

Harada, Tomio: *See*—
Takahashi, Satoshi; Harada, Tomio; Namie, Koshi; Shirahige, Hiroshi; and Sakurai, Masayuki, 3,989,600.

Haratuneian, Andrew, to American Hospital Supply Corporation. Method of making a smooth tipped endotracheal tube. 3,989,571, Cl. 156-250.000.

Harding, Gary: *See*—
Reedy, Marvin E.; and Shook, Roy D., 3,988,784.

Haren, Ralph J.: *See*—
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Harita, Yoshiaki: *See*—
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Harrington & Richardson, Inc.: *See*—
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Harris, Vernon B.: *See*—
Flumm, Paul T.; and Harris, Vernon B., 3,988,885.

Harrison, Henry, to Halm Instrument Co., Inc. Solar water heating system. 3,989,032, Cl. 126-271.000.

Harrison, Ian T.: *See*—
Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., 3,989,720.
Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., 3,989,721.

Hartmann, Clinton S.; Bomba, Steven J.; and Tenny, Ralph F., to Texas Instruments Incorporated. Surface wave multifrequency oscillator. 3,990,021, Cl. 331-177.00V.

Hartwell Corporation: *See*—
Poe, L. Richard; Davis, Clifford A.; and Bourne, William R., Jr., 3,988,808.

Hasbro Development Corporation: *See*—
Crabtree, Alfred A.; Prodger, Brian S.; and O'Connor, Hubert P., 3,988,855.

Hasegawa, Shinzo: *See*—
Okada, Senri; Ohoka, Mitsuo; and Hasegawa, Shinzo, 3,989,221.

Hasenwinkle, Earl Dean, to Weyerhaeuser Company. Log cutting and rejoining process. 3,989,078, Cl. 144-316.000.

Hashimoto, Nobuyoshi, to Olympus Optical Co., Ltd. Apparatus for manufacturing optical fiber bundle. 3,989,578, Cl. 156-433.000.

Hashimoto, Yasuyuki; and Torii, Osamu, to Ancos Co., Ltd. Multicolor mechanical writing instrument. 3,989,389, Cl. 401-30.000.

Hatabe, Etsuo: *See*—
Tottori, Hiroshi; Yoshida, Shigemasa; Isogai, Fumihiko; and Hatabe, Etsuo, 3,989,974.

Hatch, Burton D., to General Electric Company. Pumped double-pass return liquid metal collector for acyclic machines. 3,989,968, Cl. 310-219.000.

Hategan, Stephane, to Saint-Gobain Industries. Method and apparatus for detecting optical defects in transparent sheets. 3,989,387, Cl. 356-239.000.

Hauser, Raimund: *See*—
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Hawaiian Sugar Planters' Association: *See*—
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Hawley, Robert Lyle; and Tuley, William Bayard, to Ralston Purina Company. Method for protein fortification of extra pumped meats. 3,989,851, Cl. 426-266.000.

Hayano, Yuji: *See*—
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Hayashi, Nobuyuki: *See*—
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Hayashi, Seiichi: *See*—
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Hayashi, Torahiko. Method and apparatus for transferring articles. 3,989,134, Cl. 198-424.000.

Haylock, John Christopher: *See*—
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Heath-Brown, Basil, to Hoffmann-La Roche Inc. Indolobenzazepine derivatives. 3,989,717, Cl. 260-326.850.

Heberlein & Co. AG: *See*—
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Heikkala, Arvid E. Tube slitter tool. 3,988,826, Cl. 30-90.400.

Heim Universal Company, The: *See*—
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Heim Universal Corporation: *See*—
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McCloskey, Albert R., 3,989,321.

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Heitmann, Knut; Schneider, Eckart; and Eisenkopf, Hermann. Method for no-contact measurement. 3,989,378, Cl. 356-28.000.

Helgerson, Candace Kay. Ruminant and monogastric animal feed and food supplement. 3,989,846, Cl. 426-2.000.

Hellwig, Hein: *See*—
Staudenmaier, Gerhard; Herrmann, Berthold; and Hellwig, Hein, 3,989,127.

Hendershot, Dick D.: *See—*
Gorenflo, Donald L.; Hendershot, Dick D.; and Ridenour, Oscar E., 3,989,094.

Henderson, Charles R. Hitch construction. 3,989,270, Cl. 280-478.00A.

Henderson, Edward E.; Fujimoto, Akira; and Gaw, Stanley E., to Sperry Rand Corporation. Control system for magnetic disc storage device. 3,990,055, Cl. 340-172.500.

Henderson, Eulas W., to Phillips Petroleum Company. Method for pelleting carbon black. 3,989,473, Cl. 23-314.000.

Henderson, Eulas W., to Phillips Petroleum Company. Concentration of carbonaceous solids in fuel oil stream in a carbon black procus. 3,989,803, Cl. 423-450.000.

Hendricks, Udo Winfried; and Walz, Klaus, to Bayer Aktiengesellschaft. N,N-bis-(phosphonomethyl)-acrylamides. 3,989,772, Cl. 260-932.000.

Henmi, Zenzo; Sasaki, Tatsuji; Kassai, Makoto; and Okada, Masanori, to Fujitsu Ltd. Process of producing semi-hard magnetic materials. 3,989,557, Cl. 148-120.000.

Henrick, Clive A.: *See—*
Anderson, Richard J.; and Henrick, Clive A., 3,989,729.

Herbert, William G.; and Gerace, Paul L., to Xerox Corporation. Repair technique for photoreceptors. 3,989,860, Cl. 427-142.000.

Hercules Incorporated: *See—*
Aldrich, Paul H.; and Dumas, David H., 3,989,659.
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Herrmann, Berthold: *See—*
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Hershman, Arnold: *See—*
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Paulik, Frank E.; Hershman, Arnold; Roth, James F.; and Craddock, John H., 3,989,748.

Hertel, Douglas L.; and Rains, Sidney E., to International Basic Economy Corporation. Injection molding of rubber compounds. 3,989,793, Cl. 264-329.000.

Herzog, Helmut: *See—*
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Hess, Jurgen: *See—*
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Hesston Corporation: *See—*
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Hettinger, William P., Jr.: *See—*
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Heumann, Jules M., to Metropolitan Furniture Manufacturing Co. Furniture construction with removable cushions. 3,989,300, Cl. 297-440.000.

Hewlett-Packard Company: *See—*
Bodway, George E., 3,988,824.
Newton, Sterling Lewis, 3,990,004.

Hey, David Gordon; and McAloon, Kevin Thomas, to Imperial Chemical Industries Limited. Process for applying abrasion resistant phosphate coating to glass container. 3,989,864, Cl. 427-407.00A.

Higo, Akio: *See—*
Honda, Toshiko; Itaya, Nobushige; Higo, Akio; and Horiuchi, Fukashi, 3,989,654.

Higuchi, Makoto, to Kabushiki Kaisha Komatsu Seisakusho. Device for producing feeding stroke of transfer feeder for use in transfer press. 3,988,937, Cl. 74-45.000.

Hildreth, Donald Laverel: *See—*
Augustine, Paul, Jr.; Fender, Jesse Brian, Jr.; and Hildreth, Donald Laverel, 3,989,245.

Hill, Bernard E. Hydraulic drive system for a work vehicle or tractor. 3,989,117, Cl. 180-66.00R.

Hill, Earl S., to Shell Oil Company. Process for recovering sulfur from fuel gases containing hydrogen sulfide, carbon dioxide, and carbonyl sulfide. 3,989,811, Cl. 423-573.00G.

Hillberg, Robert L.: *See—*
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Hiller, Richard: *See—*
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Hinchcliffe, Bryan Ronald: *See—*
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Hirohashi, Toshiyuki: *See—*
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Hirsch, Wolfgang, to Riedel-de Haen Aktiengesellschaft. Test composition for detecting urobilinogen. 3,989,462, Cl. 23-253.0TP.

Hishinuma, Seiichi: *See—*
Umeda, Haruhiko; Mori, Katsuyoshi; Sasaki, Hiroyuki; and Hishinuma, Seiichi, 3,989,305.

Hitachi Chemical Company, Ltd.: *See—*
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Hitachi Metals, Ltd.: *See—*
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Hladik, Oldrich; Ort, Vladimir; Pechar, Vladimir; Mickulecky, Miroslav; Zerzan, Ervin; and Prebinda, Bohumir, to PIKAZ, inzenyrsky podnik. Container body. 3,989,562, Cl. 156-79.000.

Hoback, Ronald D.; and Geist, Joseph C., to Goodyear Tire & Rubber Company, The. Assembly for making a power transmission belt. 3,989,580, Cl. 156-443.000.

Hobart Corporation: *See—*
Treiber, Fritz F., 3,989,929.

Hobbs, Oliver K. Digger-shaker. 3,989,111, Cl. 171-101.000.

Hodge, Allan M.; and Owen, Calvin P., to Owen, Calvin P. Trash container lid system. 3,989,162, Cl. 220-331.000.

Hodsdon, Roy F.; Mann, Friedrich H.; and Schaefer, Henry A., to General Electric Company. Grill for audio loudspeakers and the like. 3,989,909, Cl. 179-184.000.

Hoechst Aktiengesellschaft: *See—*
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Hoekstra, Jan P.: *See—*
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Hofer, Wolfgang; and Lurssen, Klaus, to Bayer Aktiengesellschaft. Hisopropyl-2-chloroethane-(thiono)-phosphonic acid ester amide compounds and herbicidal compositions. 3,989,525, Cl. 71-86.000.

Hoffman, Robert E. Milling machine. 3,988,814, Cl. 29-27.00A.

Hoffmann-La Roche Inc.: *See—*
Fryer, Rodney Ian; and Walser, Armin, 3,989,681.
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Hoffmeister, Friedrich: *See—*
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Hogberg, Bertil; Fex, Hans; Perklev, Torsten; Veige, Sten; and Fredholm, Bo, to Aktiebolaget Leo. Secondary phosphoric acid esters. 3,989,825, Cl. 424-212.000.

Hogue, Ronald D.; King, Thomas M.; and Mitchell, Robert S., to Monsanto Company. Corrosion inhibitors and processes for using the same. 3,989,637, Cl. 252-180.000.

Hohhof, Kenneth J., to GTE Automatic Electric Laboratories Incorporated. Programmable frequency detector. 3,990,007, Cl. 324-78.00Q.

Hohmann, Eugen, to Siemens Aktiengesellschaft. Dental apparatus. 3,989,952, Cl. 307-38.000.

Hohmann, Walter; Herzog, Helmut; and Bien, Hans-Samuel, to Bayer Aktiengesellschaft. Nitroanthraquinones. 3,989,450, Cl. 8-39.00R.

Hojaiban, George, to Corometrics Medical Systems, Inc. Apparatus and method for signaling fetal distress and uterine contraction monitor for use therein. 3,989,034, Cl. 128-2.06F.

Hokama, Takeo; and Scardiglia, Frank, to Velsicol Chemical Corporation. Hot melt resinous composition comprising a primary resin, a wax and a terpolymer of styrene, isobutylene and beta-pinene. 3,989,658, Cl. 260-28.50A.

Hokkoku, Shusaburo: *See—*
Kamiya, Sadayoshi; Yamamoto, Tokihiko; Onishi, Yasuhiko; and Hokkoku, Shusaburo, 3,989,656.

Holdsworth, Robert S.: *See—*
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Hollingshead, William S., to Goodyear Tire & Rubber Company, The. Butylated, α-methyl styrenated phenolic antioxidants for polymers. 3,989,665, Cl. 260-45.95H.

Holmes, John L.: *See—*
Rohrer, John S.; and Blackledge, Vernon O., 3,989,904.

Holmes & Narver, Inc.: *See—*
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Holst, Jan-Olov Martin. Anti-locking control arrangement. 3,989,125, Cl. 188-181.00A.

Holz, George E.: *See—*
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Holzberg, Irving: *See—*
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Holzinger, Carl S.: *See—*
Purinton, Edwin C.; Holzinger, Carl S.; and Auger, Robert, 3,990,065.

Homma, Minoru; Shoji, Akio; and Nakamura, Hidehisa, to Dainippon Ink & Chemicals, Incorporated. Powder coating resin compositions of glycidyl copolymers having an internal flowing agent. 3,989,767, Cl. 260-834.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Kawaguchi, Takeshi, 3,989,261.

Honda, Toshiko; Itaya, Nobushige; Higo, Akio; and Horiuchi, Fukashi, to Sumitomo Chemical Company, Limited. Process for preparing cis-chrysanthemic acid. 3,989,654, Cl. 260-514.00H.

Honda, Yuitsu: *See—*
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Honeywell Inc.: *See—*
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Honeywell Information Systems, Inc.: *See—*
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Honmann, Winfried, to LTG Lufttechinische GmbH. Air outlet. 3,988,973, Cl. 98-40.00C.

Hooker Chemicals & Plastics Corporation: *See—*
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Hope, Henry F.; and Hope, Stephen F. Web transporting system. 3,989,176, Cl. 226-189.000.

Hope, Stephen F.: *See—*
Hope, Henry F.; and Hope, Stephen F., 3,989,176.

Horan, Phyllis J., to Will Ross, Inc. Side belted surgical gown or the like. 3,988,781, Cl. 2-338.000.

Horiuchi, Fukashi: *See—*
Honda, Toshiko; Itaya, Nobushige; Higo, Akio; and Horiuchi, Fukashi, 3,989,654.

Hormann, Karl; and Kober, Hans, to Kugelfischer Georg Schafer & Co. Tapered-roller bearing with massive cage. 3,989,326, Cl. 308-218.000.

Hornfeck, Werner: *See—*
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Hornman, Johannes Petrus: *See—*
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Hornung, Richard E.: *See—*
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Hosono, Isamu; and Shikano, Yoshiro, to Mitsubishi Denki Kabushiki Kaisha. Vapor cooling device for semiconductor device. 3,989,099, Cl. 165-80.000.

Hotsenpiller, John R.: *See—*
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Hou, Hsieh Sheng, to Xerox Corporation. Microstrip/stripline impedance transformer. 3,990,024, Cl. 333-33.000.

Houlihan, William J.; and Nadelson, Jeffrey, to Sandoz, Inc. 3-Substituted-4-aryl isoquinolines. 3,989,704, Cl. 260-283.00R.

Houser, David Erie; Lubert, Kenneth John; and Morenus, Richard Jay, to International Business Machines Corporation. Wire maze penetrating apparatus. 3,989,178, Cl. 228-4.500.

Hovanec, Thomas R.: *See—*
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Hoyler, Alfred, to Robert Bosch G.m.b.H. Positioning arrangement having a drive motor. 3,988,891, Cl. 60-288.000.

Hrdina, Karel; Dostal, Jaroslav; and Borovec, Vaclav, to Vyzkumny Ustav Bavinarsky. Method of and apparatus for compensating for weft tension in traveling-wave shedding looms. 3,989,069, Cl. 139-436.000.

Hu, Kuo-Chen, to Hughes Aircraft Company. Method for fabrication of multilayer interconnected microelectronic devices having small vias therein. 3,988,823, Cl. 29-577.000.

Hubbs, Warren C.: *See—*
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Hucknall, Richard. Controlled access slide bolt. 3,989,291, Cl. 292-262.000.

Hudkins, Philip George. Game bag for divers. 3,988,853, Cl. 43-55.000.

Hudson, Kenneth Clifford; and Kenville, Richard Francis, to RCA Corporation. Optical scanner with large depth of focus. 3,989,348, Cl. 350-6.000.

Hugelshofer, Paul, to Ciba-Geigy Corporation. Stable, concentrated solutions of complex metal compounds of azo dyestuffs. 3,989,452, Cl. 8-42.00R.

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Hull, Thomas Neil, Jr.: *See—*
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Hulten, Olle. Proximal soldering tabs for a dental prosthetic structure. 3,988,830, Cl. 32-12.000.

Humbert, Manfred, to Maschinenfabrik B. Maier KG. Rotary cutter. 3,989,077, Cl. 144-230.000.

Hunt, Robert P.; and Brinkman, Eugene V., to Picker Corporation. X-ray spot filmer. 3,989,950, Cl. 250-468.000.

Hurlock, John R., to Nalco Chemical Company. Method of improving the removal of mother liquor from acrylamide crystals. 3,989,754, Cl. 260-561.00N.

Hursen, Thomas F.: *See—*
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Hutchison, John W., to Pullman Incorporated. Lifting mechanism for sliding doors. 3,988,801, Cl. 16-99.000.

Huttebraucker, Dag-Harald: *See—*
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Huydts, Eduard J. C.: *See—*
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Ichikawa, Yataro; Honda, Yuitsu; Soma, Kazuhiko; Suzuki, Nobuo; and Yamaji, Teizo, to Teijin Limited. Process for the preparation of pyridines. 3,989,706, Cl. 260-290.00P.

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Infeld, Martin Howard; and Newmark, Harold Leon, to Hoffmann-La Roche Inc. Stabilization of copper complexes of 6-methoxy-1-phenazinol 5,10-dioxide. 3,989,830, Cl. 424-245.000.

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Inland Container Corporation: *See—*
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Ito, Tetsuo; and Nishihara, Motohisa, to Hitachi, Ltd. Data transmission system using frequency permutation codes. 3,990,071, Cl. 340-347.0DD.

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Jack, James; and Taylor-Brown, Terence John, to Bakelite Xylonite Limited. Method of making a retro-reflective beaded material. 3,989,775, Cl. 264-1.000.

Jackson, Byron L.; and Wagner, Joseph P., to Robertshaw Controls Company. Modular valve. 3,989,058, Cl. 137-269.000.

Jackson, Earl V.; Schoppe, Wayne F.; Squassoni, Gino F.; and Warter, Peter J., to Xerox Corporation. Apparatus for contacting a roller to a surface to be contacted. 3,989,367, Cl. 355-3.00P.

Jackson, Earl V.: *See—*
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Jackson, Thomas Meirion; and Eldridge, Peter Gordon, to International Standard Electric Corporation. Reducing aperture-size of shadow mask in painting black matrix CRT screen. 3,989,523, Cl. 96-36.100.

Jacobs, James W., to General Motors Corporation. Refrigerator with add-on ice cream maker. 3,988,902, Cl. 62-136.000.

Jacobs, Richard L.; and Hively, Richard L., to Sherwin-Williams Company, The. Process for preparing benzoxazines. 3,989,698, Cl. 260-244.00A.

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Jacobson, Michael D., to United States of America, Navy. Filter/cooler. 3,988,888, Cl. 60-204.000.

Jacobszoon, Hans Wilhelm, to Schloemann-Siemag Aktiengesellschaft. Mandrel for collecting wire coils. 3,989,205, Cl. 242-129.000.

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Jaffe, Joseph, to Chevron Research Company. Hydrotreating process employing thermactivated catalysts comprising catalytic metals-free crystalline zeolitic molecular sieve particles dispersed in a gel matrix. 3,989,619, Cl. 208-111.000.

Jaffe, Mary S.: *See—*
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Jager, Horst; and Groll, Manfred, to Bayer Aktiengesellschaft. Reactive dyestuffs. 3,989,692, Cl. 260-242.000.

Jaggard, James Frank Robert, to Imperial Chemical Industries Limited. Olefine polymerization catalyst. 3,989,641, Cl. 252-429.00B.

Jago, Edward John, to Foseco International Limited. Composition for use in forming heat insulating hot top liners and method of making same. 3,989,533, Cl. 106-55.000.

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Janssen, Hans-Georg, to Aktiengesellschaft "Weser". Thrust coupling for watercraft. 3,988,999, Cl. 114-235.00A.

Janssen, Paul Adriaan Jan; Van Heertum, Albert H. M. Th.; Vandenberk, Jan; and Van der Aa, Marcel J. M. C., to Janssen Pharmaceutica N.V. Benzimidazolinone derivatives. 3,989,707, Cl. 260-293.600.

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Januszewski, Joseph Paul; Bahouth, Tayseer George, deceased; and by Bahouth, Zaher G., administrator, to Colgate-Palmolive Company. Stabilized dentifrice. 3,989,813, Cl. 424-54.000.

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Jenkins, Richard A., to Omark Industries, Inc. Folding ladder for truck mounted loader. 3,989,122, Cl. 182-84.000.

Jenkins, Robert K.; Kimmel, Boyce G.; and Luster, Gary, to Hughes Aircraft Company. Low temperature curing resin system. 3,989,673, Cl. 260-47.0EN.

Jennings, Roy E., to Royal Seating Corporation. Chair and supporting base for a seat. 3,989,212, Cl. 248-188.900.

Jenoptik Jena G.m.b.H.: *See—*
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Jensen, Arthur S.; and Williams, Clarence, to Westinghouse Electric Corporation. Electron beam source of narrow energy distribution. 3,990,038, Cl. 315-17.000.

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Jetzer, Raimund, to Jetzer Engineering AG. Conversion of refuse into fibrous material. 3,989,499, Cl. 71-9.000.

Jilla, Dara Ardeshir, to Martin Processing Company, Inc. Multicoloring polyester textile materials with acid dyes. 3,989,453, Cl. 8-66.000.

Jim Dandy Company, The: *See—*
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Jonas, Rochus; Mehrhof, Werner; Becker, Karl Heinz; and Schliep, Hans-Jochen, to Merck Patent Gesellschaft mit beschrankter Haftung. Pharmaceutical compositions containing adenine derivatives. 3,989,833, Cl. 424-253.000.

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Jones, Benjamin Bostick; Karrasch, Richard John; and Kelly, Mike, to Jim Dandy Company, The. Freezing process for production of instant grits. 3,989,855, Cl. 426-444.000.

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Jones, James H.: *See—*
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Jones, James Kevin, to Petrocarbon Developments Limited. Producing gaseous fuels of high calorific value. 3,989,478, Cl. 48-196.00R.

Jones & Laughlin Steel Corporation: *See—*
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Jonge Poerink, Jannes. Method and apparatus for the production of prestressed coil springs. 3,988,915, Cl. 72-144.000.

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Joo, Louis A.; Prescott, Roger; Sharpe, Gordon E.; and Snodgrass, Frank E., to Great Lakes Carbon Corporation. Treatment of carbon fibers. 3,989,802, Cl. 423-447.100.

Joseph Lucas (Industries) Limited: *See—*
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Juhasz, John E.: *See—*
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Juillard, Yves; and Le Chatelier, Jacques, to Societe Alsacienne de Constructions Mecaniques de Mulhouse. Device for feeding fibers to units for spinning freed fibers. 3,988,881, Cl. 57-58.910.

Julian, Randall K., to Sunbeam Plastics Corporation. Child-resistant locking means for a twist-action container cap. 3,989,152, Cl. 215-216.000.

Jurgensen, Richard L. Alarm indicator responsive to improper position of a control lever. 3,990,064, Cl. 340-267.00R.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Higuchi, Makoto, 3,988,937.
Umeda, Haruhiko; Ito, Hiroshi; Mizuno, Tadatoshi; and Harita, Yoshiaki, 3,989,301.
Umeda, Haruhiko; Mori, Katsuyoshi; Sasaki, Hiroyuki; and Hishinuma, Seiichi, 3,989,305.

Kabushiki Kaisha Ogura Chuck Seisakusho: *See—*
Sakamoto, Kaneaki; and Tokunaga, Ichiro, 3,988,827.

Kabushiki Kaisha Suiken: *See—*
Sato, Toshiyuki, 3,988,819.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Miyazaki, Tsutomu; Kato, Takashi; Suzuki, Yoshihisa; and Ueda, Shozo, 3,988,880.

Kada, Hironosuke: *See—*
Ohi, Atsushi; Arai, Toshio; Ihochi, Akihiko; Kada, Hironosuke; Sekino, Teruyoshi; and Akahori, Kenichi, 3,989,921.

Kadai, Tonu: *See—*
Werstiuk, Nick Henry; and Kadai, Tonu, 3,989,705.

Kafunek, Pavel: *See—*
Voboril, Bohuslav; Reichel, Pavel; and Kafunek, Pavel, 3,989,095.

Kahelin, Edward W. Machine for propelling balls of various diameters. 3,989,027, Cl. 124-58.000.

Kaiho, Isao; and Takahashi, Ryuji, to Showa Denko Kabushiki Kaisha. Process for production of spherical porous fillers for liquid chromatography by suspension polymerization of monovinyl and polyvinyl aromatic monomers in the presence of paraffin wax. 3,989,649, Cl. 260-2.10R.

Kaiser, Bruno: *See—*
Van Dusen, Charles Harrison; and Kaiser, Bruno, 3,990,067.

Kaiser, Hans-Jurgen: *See—*
Hamisch, Hansjoachim; and Kaiser, Hans-Jurgen, 3,990,084.

Kakinaka, Arao, to Toyo Boseki Kabushiki Kaisha. Automatic control apparatus for weaving machine. 3,989,068, Cl. 139-353.000.

Kalopissis, Gregoire; Bugaut, Andree; Estradier, Francoise; Ghilardi, Giuliana; Grollier, Jean-Francois; and Bore, Pierre, to Societe Anonyme dite: L'Oreal. Process for nonpermanently dyeing human hair with indamine indoaniline and indophenol hair dyes. 3,989,447, Cl. 8-10.100.

Kalt, Charles G. Electro-static device with rolling electrode. 3,989,357, Cl. 350-161.000.

Kamata, Jyoji; Obata, Makoto; Yamamoto, Toshio; and Murase, Shigeo, to Matsushita Electric Industrial Co., Ltd. Method of reconditioning air from central air conditioning system and air conditioning unit to carry out the method. 3,988,900, Cl. 62-92.000.

Kameyama, Yukio; Masuko, Hitoshi; Matsumoto, Yasuo; and Sakata, Masaru, to Nippon Hoso Kyokai; and Sakata, Masaru. Dynamic negative pressure type floating head system. 3,990,106, Cl. 360-103.000.

Kamiya, Sadayoshi; Yamamoto, Tokihiko; Onishi, Yasuhiko; and Hokkoku, Shusaburo, to Karme Company Ltd. Dextran-alkyl methacrylate graft composition for contact lens and corneas. 3,989,656, Cl. 260-17.4GC.

Kamo, Yoshihisa: *See—*
Cooper, Duane H.; Takagi, Toshihiko; and Kamo, Yoshihisa, 3,989,903.

Kampert, William P., to Aluminum Company of America. Metal plating on aluminum. 3,989,606, Cl. 204-33.000.

Kamphoefner, Fred J.; and Andeen, Gerry B., to Stanford Research Institute. Handwriting sensing and analyzing apparatus. 3,988,934, Cl. 73-432.00R.

Kanebo, Ltd.: *See—*
Ito, Takashi; and Matsui, Hironori, 3,989,545.

Kanitz, Bruce R.; and Jacobson, Charles L., to Xerox Corporation. Carrier detect circuit. 3,990,048, Cl. 340-171.00R.

Kano, Gota: *See—*
Takagi, Hiromitsu; and Kano, Gota, 3,989,962.

Kano, Ikushi; Hakamada, Takeshi; Soma, Misao; and Kashimura, Mituo, to Hitachi, Ltd. Insulated windings provided with a mould releasing material. 3,990,029, Cl. 335-297.000.

Kanoh, Natsuki: *See—*
Yamaguchi, Kazuo; Kanoh, Natsuki; Tanaka, Toru; Enokido, Nobuo; Murakami, Atsushi; and Yoshida, Seiji, 3,989,881.

Kanzaka, Yoshihiro, to Yoshida Kogyo Kabushiki Kaisha. Slider for adjustable fastening device. 3,988,812, Cl. 24-206.00B.

Kaplan, Mark: *See—*
Feintuch, Martin W.; and Kaplan, Mark, 3,989,209.

Kaplan, Murray. Instant coffee brewer. 3,988,974, Cl. 99-285.000.

Kaptay, Gyorgy: *See—*
Dobos, Gyorgy; Felfoldi, Zoltan; Horvath, Gyula; Kaptay, Gyorgy; Osvald, Zoltan; and Solymar, Karoly, 3,989,513.

Karlsson, Kent Ingemar; and Westerlund, Bengt Arvid, to Atlas Copco Aktiebolag. Positioning device. 3,989,130, Cl. 192-143.000.

Karme Company Ltd.: *See—*
Kamiya, Sadayoshi; Yamamoto, Tokihiko; Onishi, Yasuhiko; and Hokkoku, Shusaburo, 3,989,656.

Karnes, William F., to TOCOM, Inc. Remote transceiver for a multiple site location in a two-way cable television system. 3,990,012, Cl. 325-308.000.

Karrasch, Richard John: *See—*
Jones, Benjamin Bostick; Karrasch, Richard John; and Kelly, Mike, 3,989,855.

Kashimura, Mituo: *See—*
Kano, Ikushi; Hakamada, Takeshi; Soma, Misao; and Kashimura, Mituo, 3,990,029.

Kashio, Toshio, to Casio Computer Co., Ltd. Time setting device for an electronic watch. 3,988,886, Cl. 58-23.00R.

Kassai, Makoto: *See—*
Henmi, Zenzo; Sasaki, Tatsuji; Kassai, Makoto; and Okada, Masanori, 3,989,557.

Kastrubin, Eduard Mikhailovich: *See—*
Nozhnikov, Valentin Matveevich; and Kastrubin, Eduard Mikhailovich, 3,989,051.

Katagiri, Toshio: *See—*
Suga, Tokuji; and Katagiri, Toshio, 3,990,108.

Kato, Takashi: *See—*
Miyazaki, Tsutomu; Kato, Takashi; Suzuki, Yoshihisa; and Ueda, Shozo, 3,988,880.

Katz, Harold W.; Venturi, Gino; Bennett, Melvin T.; and Edwin, Allan I., to Interactive Systems, Inc. Multiple terminal computer system with mixed terminal data reception rates. 3,990,046, Cl. 340-147.00R.

Katz, Harry S.: *See—*
Orlando, Joseph M.; Katz, Harry S.; and Rainford, Jack W., 3,989,570.

Katzer, Ernst, to Knorr-Bremse GmbH. Resilient railway disc brake pivotal mounting. 3,989,126, Cl. 188-206.00R.

Kautex-Werke Reinold Hagen GmbH: *See—*
Kiefer, Erich; Rolniczak, Heinz; and Bohlscheid, Peter, 3,989,437.

Kawaguchi, Takeshi, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle front-wheel suspension with means for restraint of compression of a telescopic front upon braking. 3,989,261, Cl. 280-276.000.

Kawai, Takashi, to Hitachi Metals, Ltd. Core supply system for metal founding. 3,989,090, Cl. 164-228.000.

Kawakami, Touhei; Tajima, Kunio; and Hayashi, Seiichi, to Hitachi, Ltd. Electrophotographic copying apparatus. 3,989,364, Cl. 355-3.00R.

Kawasaki Jukogyo Kabushiki Kaisha: *See—*
Matsumoto, Nobuo; Yoshimoto, Yoshio; Miyake, Tsutomu; and Yokoyama, Gumpei, 3,988,983.

Kawasaki, Masahiro: *See—*
Mori, Chiharu; and Kawasaki, Masahiro, 3,990,086.

Kawasaki Steel Corporation: *See—*
Matsumoto, Nobuo; Yoshimoto, Yoshio; Miyake, Tsutomu; and Yokoyama, Gumpei, 3,988,983.

Kawase, Shoji; Inata, Hiroo; and Shima, Takeo, to Teijin Limited. Stabilized polyester composition and method for stabilizing polyester. 3,989,664, Cl. 260-45.85B.

Kawashima, Kazumi, to Matsushita Electric Industrial Co., Ltd. Channel selector for electronic tuner having channel voltages stored in memory. 3,990,027, Cl. 334-15.000.

Kawashima, Kenichi: *See—*
Sato, Masayuki; Fujisawa, Fumio; and Kawashima, Kenichi, 3,989,426.

Kawasumi, Shohachi: *See—*
Nakaguchi, Kohei; Kawasumi, Shohachi; Hirooka, Masaaki; Yabuuchi, Hiroshi; and Takao, Hiroyoshi, 3,989,882.

Kay, Edward Leo: *See—*
Lohr, Delmar F., Jr.; and Kay, Edward Leo, 3,989,657.

Kearney-National, Inc.: *See—*
Ball, Robert D., 3,989,341.

Keen, Harry J.: *See—*
Fish, David H.; Knodel, Charles H.; Keen, Harry J.; and Barrett, Paul, 3,990,032.

Keilholz, Friedrich, to August Bilstein, Firma. Vehicle lifting jack. 3,989,225, Cl. 254-126.000.

Keller, Albert G.: *See—*
Frumkin, Mitchell J.; and Keller, Albert G., 3,989,393.

Keller, Wolfgang, to Siemens Aktiengesellschaft. Apparatus for crucible-free zone melting of semiconductor crystal rods. 3,989,468, Cl. 23-273.0SP.

Kelly, Mike: *See—*
Jones, Benjamin Bostick; Karrasch, Richard John; and Kelly, Mike, 3,989,855.

Kendall Company, The: *See—*
Davies, Richard B., 3,989,041.

Kendrick, Hardy Louis. Boat anchoring device. 3,988,998, Cl. 114-230.000.

Kennedy, Ralph C., to Leisure Group, Inc., The. Combined cylinder-release and safety lever for revolvers. 3,988,847, Cl. 42-66.000.

Kent, Frederick M.; and Sokol, Michael, to Bio-Data Corporation. Platelet aggregation monitoring device. 3,989,382, Cl. 356-39.000.

Kenville, Richard Francis: *See—*
Hudson, Kenneth Clifford; and Kenville, Richard Francis, 3,989,348.

Kerstholt, Fritz. Chair or couch with a movable back support. 3,989,297, Cl. 297-300.000.

Keyes, Richard M., to Beatrice Foods Co. Dispensing machine. 3,989,492, Cl. 62-136.000.

Keystone Industries, Inc.: *See—*
Sheesley, Jay R., 3,989,287.

Khaidurov, Efim Leontievich; Razorenov, Vladimir Alexandrovich; Bulanov, Sergei Sergeevich; and Gorbov, Oleg Mikhailovich. Safety device which arrests the hammer and blocks the sight. 3,988,963, Cl. 89-148.000.

Kiefer, Erich; Rolniczak, Heinz; and Bohlscheid, Peter, to Kautex-Werke Reinold Hagen GmbH. Moulding apparatus. 3,989,437, Cl. 425-326.00B.

Kiga, Shotaro; Chiba, Shozo; Edahiro, Kenichi; Yoshida, Naoshi; and Nagasawa, Masuo, to Nippon Soda Company Limited. Diaphragm process electrolytic cell. 3,989,615, Cl. 204-252.000.

Kihara, Toshimasa, to Hitachi, Ltd. Binary incrementer circuit. 3,989,940, Cl. 235-175.000.

Kiko, Frederick J., to Lorain Products Corporation. Repeater for transmission lines. 3,989,906, Cl. 179-170.00R.

Kikugawa, Kiyomi: *See—*
Suehiro, Hideo; Kikugawa, Kiyomi; Ichino, Motonobu; and Nakamura, Tokuro, 3,989,682.

Kikugawa, Shigeharu. Method of making a wire rope. 3,988,884, Cl. 57-162.000.

Kikuyama, Akira; Toyama, Nobuo; and Takahashi, Shigekazu, to Citizen Watch Co., Ltd. Pulse motor. 3,989,967, Cl. 310-112.000.

Kilian, Rodolfo G., to Intensa, S.A. Process and apparatus for scrubbing exhaust gas from cyclone collectors. 3,989,485, Cl. 55-90.000.

Kimberly-Clark Corporation: *See—*
Lofgren, Lewis C.; and Farrow, Stephen E., 3,989,040.

Kimmel, Boyce G.: *See—*
Jenkins, Robert K.; Kimmel, Boyce G.; and Luster, Gary, 3,989,673.

Kimura, Shin: *See—*
Terasawa, Yoshio; and Kimura, Shin, 3,990,090.

King, Thomas M.: *See—*
Hogue, Ronald D.; King, Thomas M.; and Mitchell, Robert S., 3,989,637.

Kinugasa, Masayuki: *See—*
Fujioka, Tokio; Kinugasa, Masayuki; Iizumi, Shozo; Teshima, Shizuhiro; and Shimizu, Isamu, 3,989,514.

Kita, Yasuo, to Shimadzu Seisakusho Ltd. Heating system. 3,989,189, Cl. 237-1.00R.

Klasing Hand Brake Co.: *See—*
Klasing, Wayne G., 3,988,944.

Klasing, Wayne G., to Klasing Hand Brake Co. Quick-release mechanism for a railway car hand brake of the non-spin type. 3,988,944, Cl. 74-505.000.

Klauer, Hans Dieter: *See—*
Schroder, Adolf; and Klauer, Hans Dieter, 3,989,071.

Klein, Carl F.; Thoma, Paul E.; and Weber, Gerald E., to Johnson Controls, Inc. Sensing element and detection system employing such element for detection of environmental borne material. 3,989,463, Cl. 23-254.00E.

Klein, Charles. Inflatable structure for producing low relief figures. 3,988,792, Cl. 5-365.000.

Klein, Gerald B. Hook connector. 3,988,852, Cl. 43-44.830.

Klein, Schanzlin & Becker Aktiengesellschaft: *See—*
Blank, Wilhelm, 3,989,966.

Kleppe, Terry W.: *See—*
Morrow, James G., Sr.; Pech, David J.; and Kleppe, Terry W., 3,989,325.

Kline, Richard H., to Goodyear Tire & Rubber Company, The. Method of preparing phenolic antioxidants by condensing active methylene compounds with 3,5-di-tert alkyl-4-hydroxybenzylpyridinium salts. 3,989,738, Cl. 260-473.00S.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Stern, Julius Heinrich Johannes, deceased; Strauss, Werner; and Kohlmann, Albert, 3,989,620.

Klutchko, Sylvester; Sonntag, Arch Christian; and Shavel, John, Jr., to Warner-Lambert Company. 3-Phenylhydroindoles. 3,989,714, Cl. 260-326.11R.

KMC, Inc.: *See—*
Korcey, Joseph J., Jr., 3,988,813.

KMS Fusion, Inc.: *See—*
Melmoth, David L., 3,989,358.

Knight, Jerry K., to Rockwell International Corporation. Method and apparatus for determining AM modulation factor. 3,990,011, Cl. 325-133.000.

Knirsch, Franco; Montanari, Lucio; and Rossi, Giorgio, to Ing. C. Olivetti & C., S.p.A. Electrothermal printing unit. 3,989,131, Cl. 197-1.00R.

Knodel, Charles H.: *See—*
Fish, David H.; Knodel, Charles H.; Keen, Harry J.; and Barrett, Paul, 3,990,032.

Knorr-Bremse GmbH: *See—*
Katzer, Ernst, 3,989,126.

Knupfer, Hans: *See—*
Braden, Rudolf; and Knupfer, Hans, 3,989,743.

Kobayashi, Masayoshi; and Yuzawa, Yasutaka, to Diesel Kiki Co., Ltd. Dash pot arrangement for distribution type fuel injection pump cut off barrel. 3,989,021, Cl. 123-139.0AZ.

Kobe Steel Ltd.: *See—*
Ohi, Atsushi; Arai, Toshio; Ihochi, Akihiko; Kada, Hironosuke; Sekino, Teruyoshi; and Akahori, Kenichi, 3,989,921.
Oki, Tsuguaki; Sudo, Masatoshi; Tsutsumi, Hiromori; Hosomi, Koji; Tsukatani, Ichiro; and Takahara, Teruyuki, 3,989,553.
Toyama, Akira; and Ishizaki, Koji, 3,989,810.

Kober, Hans: *See—*
Hormann, Karl; and Kober, Hans, 3,989,326.

Kober, Harald; and Huydts, Eduard J. C., to G. Siempelkamp & Co. Apparatus for producing boards of filamentary material. 3,989,581, Cl. 156-510.000.

Koch, Kenneth Elmon, Jr.: *See—*
Bruner, Leonard Bretz; and Koch, Kenneth Elmon, Jr., 3,989,790.

Kochanowski, John E.: *See—*
Takekoshi, Tohru; and Kochanowski, John E., 3,989,670.

Kodama, Toshikazu, to Tokyo Shibaura Electric Co., Ltd. Elastic surface wave device. 3,990,023, Cl. 333-30.00R.

Kodama, Yukuo, to Nippon Electric Company, Ltd. Chattering preventive circuit. 3,989,960, Cl. 307-247.00A.

Koehler, Harold: *See—*
Chou, Eddie C.; Crnojevich, Ranko P.; and Koehler, Harold, 3,989,509.

Koerner, Ralph J., to Canoga Controls Corporation. Inductive loop vehicle detector. 3,989,932, Cl. 235-92.0FQ.

Koerner, Roger J.: *See—*
Burkhardt, Joseph A.; Childers, Thomas W.; and Koerner, Roger J., 3,989,223.

Koerper Engineering Associates, Inc.: *See—*
Koerper, Phillip E., 3,989,859.

Koerper, Phillip E., to Koerper Engineering Associates, Inc. Coating entire surface of three-dimensional article with heat fusible plastic. 3,989,859, Cl. 427-47.000.

Kohjin Co., Ltd.: *See—*
Suehiro, Hideo; Kikugawa, Kiyomi; Ichino, Motonobu; and Nakamura, Tokuro, 3,989,682.

Kohlmann, Albert: *See—*
Stern, Julius Heinrich Johannes, deceased; Strauss, Werner; and Kohlmann, Albert, 3,989,620.

Koizumi, Hideaki: *See—*
Uchino, Koichi; and Koizumi, Hideaki, 3,989,983.

Kojima, Mitsuo, to Kojima Precision Parts Co., Ltd. Pencil type gas lighter. 3,989,445, Cl. 431-256.000.

Kojima Precision Parts Co., Ltd.: *See—*
Kojima, Mitsuo, 3,989,445.

Kojima, Takuhito: *See—*
Yoshida, Shinichiro; Watanabe, Yoshitsugu; Hayano, Yuji; Ohara, Susumu; and Kojima, Takuhito, 3,989,892.

Kolettis, Nicholas John; O'Brien, Kevin Christopher; and Owens, Gerald John, to Bell Telephone Laboratories, Incorporated. Computer controlled automatic response system. 3,990,050, Cl. 340-172.500.

Kominami, Hideyuki: *See—*
Amagami, Keizo; Mori, Hazime; Kominami, Hideyuki; and Hirai, Yukio, 3,989,916.

Komori, Shigehiro; Ariga, Masao; and Nitanda, Hiroshi, to Canon Kabushiki Kaisha. Copying machine. 3,989,236, Cl. 271-4.000.

Kompe, Dieter; and Delvos, Hermann-Josef, to U.S. Philips Corporation. Developing chamber for electrostatic latent images. 3,989,007, Cl. 118-637.000.

Konantz, Mark L.; and Leisure, Ronald K., to General Motors Corporation. Evaporated solderable multilayer contact for silicon semiconductor. 3,990,094, Cl. 357-71.000.

Konno, Isago; and Ohtani, Tadao, to Matsushita Electric Industrial Co., Ltd. Magnetron employing a permanent magnet formed of a manganese-aluminum-carbon system alloy. 3,989,979, Cl. 315-39.510.

Korcey, Joseph J., Jr., to KMC, Inc. Slide clasp. 3,988,813, Cl. 24-238.000.

Kormann, Harro; and Susz, Dietfried, to U.S. Philips Corporation. Circuit arrangement for amplitude controlling an NTSC chrominance signal with high noise immunity. 3,990,104, Cl. 358-26.000.

Korndorfer, Eugen: *See—*
Wiebke, Gunter; Korndorfer, Ludwig; Korndorfer, Eugen; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, 3,989,883.

Korndorfer, Ludwig: *See—*
Wiebke, Gunter; Korndorfer, Ludwig; Korndorfer, Eugen; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, 3,989,883.

Korsten, Andreas: *See—*
Wiebke, Gunter; Korndorfer, Ludwig; Korndorfer, Eugen; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, 3,989,883.

Koshkin, Victor Simeon: *See—*
Estes, Leland Lloyd, Jr.; Fridrichsen, Anton Fridrich; and Koshkin, Victor Simeon, 3,989,788.

Koszegi, George, to Koszegi Leather & Vinyl Products, Inc. Carrying case with expandable compartment. 3,989,080, Cl. 150-1.700.

Koszegi Leather & Vinyl Products, Inc.: *See—*
Koszegi, George, 3,989,080.

Kovacs nee Mindler, Vera: *See—*
Huhn, Magda; Tardos, Laszlo; Somfai, Eva; Resorszki, Gabor; Kovacs nee Mindler, Vera; and Palffy nee Oswald, Maria, 3,989,837.

Koyama, Tetsuo: *See—*
Ikura, Kenichiro; Sakamoto, Nobukazu; Koyama, Tetsuo; and Miyazaki, Masaru, 3,988,987.

Kraft, Joseph K.: *See—*
Courson, Iber C.; and Kraft, Joseph K., 3,989,133.

Kragt, Clifford L.; and Ballen, Harold E., to Upjohn Company, The. Elution device for gel electrophoresis. 3,989,612, Cl. 204-180.00G.

Krasnow, Philip, to Kurzban, Mitchell, a part interest. Electrochemical cell having lead fluoride cathode. 3,989,543, Cl. 429-118.000.

Kratt, Henry J. Self adjusting brush arm assembly. 3,988,798, Cl. 15-88.000.

Kressel, Henry: *See—*
Ettenberg, Michael; and Kressel, Henry, 3,990,101.

Krichbaum, Paul L.: *See—*
da Costa, Harry H.; and Krichbaum, Paul L., 3,988,836.

Krob, Vaclav: *See—*
Prochazka, Karel; Novak, Jan; Simunek, Jaroslav; Peterka, Vlastimil; and Krob, Vaclav, 3,989,634.

Kroeker, Gerald H., to Epkro Plastics, Inc. Sliding gate assembly for irrigation pipes. 3,989,224, Cl. 251-145.000.

Ku, Han San, to Allied Chemical Corporation. Method of regulating plant growth. 3,989,500, Cl. 71-28.000.

Kubacki, Edward Frank: *See—*
Nixon, Wayne Robert; Hitchler, Edward Willard; and Kubacki, Edward Frank, 3,989,159.

Kuchyt, Charles. Heavy duty shear. 3,988,954, Cl. 83-525.000.

Kugelfischer Georg Schafer & Co.: *See—*
Hormann, Karl; and Kober, Hans, 3,989,326.

Kuhling, Monika. Frame for pictures or the like. 3,988,846, Cl. 40-152.100.

Kumada, Akio, to Hitachi, Ltd. Ferroelectric analog memory device and method of operating the same. 3,990,057, Cl. 340-173.200.

Kume, Yoshiharu: *See—*
Yamamoto, Hisao; Inaba, Shigeho; Hirohashi, Toshiyuki; Yamamoto, Michihiro; Ishizumi, Kikuo; Akatsu, Mitsuhiro; Maruyama, Isamu; Kume, Yoshiharu; Mori, Kazuo; and Izumi, Takahiro, 3,989,829.

Kunderman, Fred Kurt, to Dresser Industries, Inc. Shaft stiffness control apparatus. 3,989,258, Cl. 277-29.000.

Kung, Joseph T.: *See—*
Amason, Myron P.; and Kung, Joseph T., 3,989,984.

Kunii, Daizo; and Kunugi, Taiseki. Continuous catalytic gasification of heavy hydrocarbon oils with recirculated fluidized catalyst. 3,989,481, Cl. 48-215.000.

Kunugi, Taiseki: *See—*
Kunii, Daizo; and Kunugi, Taiseki, 3,989,481.

Kurata, Naoji: *See—*
Fujii, Toshihiro; Kurata, Naoji; and Okuda, Yukio, 3,989,763.

Kuratle, Henry, III, to Du Pont de Nemours, E. I., and Company. Methods for increasing rice crop yields. 3,989,501, Cl. 71-77.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Morita, Tomijiro; Funahashi, Isao; Igarashi, Koichi; and Takaiwa, Masakazu, 3,989,796.

Kurihara, Shinji; and Osazima, Kazuharu. Process for preparation of seasonings derived from animal meat. 3,989,847, Cl. 426-7.000.

Kurtzer, Enid Baum, to Lawrence Peska Associates, Inc., a part interest. Portable electrically heated garment. 3,989,924, Cl. 219-211.000.

Kurz, Gunter: *See—*
Besenmatter, Walter; Muszumanski, Trude; and Kurz, Gunter, 3,989,349.

Kurzban, Mitchell: *See—*
Krasnow, Philip, 3,989,543.

Kusano, Masaaki: *See—*
Okuhara, Shinzi; Ohhinata, Ichiro; and Kusano, Masaaki, 3,990,102.

Kutsuna, Muneharu: *See—*
Masubuchi, Koichi; and Kutsuna, Muneharu, 3,989,920.

L. B. Holliday & Co. Limited: *See—*
Dixon, Leonard Fox; Hinchcliffe, Bryan Ronald; and Vellins, Cyril Eric, 3,989,449.

La Precision Industrielle: *See—*
Lioux, Jean, 3,988,969.

Laber, Leopold: *See—*
Fuchs, Dieter; and Laber, Leopold, 3,988,825.

Labie, Allan S.; Lew, Irwin Paul; Thornton, Charles H.; and Gutman, Abraham, to International Environmental Dynamics, Inc. Support for floor to hollow core tower. 3,988,868, Cl. 52-236.000.

Lacefield, William B., to Eli Lilly and Company. Topically-active anti-inflammatory 3-chloro-5,6-diaryl-1,2,4-triazines. 3,989,831, Cl. 424-249.000.

Lacklison, David Edward; Page, John Lincoln; Ralph, Hugh Ivor; and Scott, George Blair, to U.S. Philips Corporation. Bismuth substituted rare earth garnets as magneto-optic materials exhibiting magnetic circular dichroism. 3,989,352, Cl. 350-151.000.

Lahiri, Chitta R.: *See—*
Bell, Richard; Sato, Takao; Lahiri, Chitta R.; and Carver, Thomas G., 3,989,868.

Lai, Chi Sun; and Capurka, Zbynek Antonin, to Motorola, Inc. Constant energy electronic ignition system. 3,989,024, Cl. 123-148.00E.

Laird Group Limited, The: *See—*
McDonald, Ronald D., 3,988,898.

Lakeman, Thomas Ashley. Game apparatus. 3,989,250, Cl. 273-102.00S.

Lam, Hon Wai: *See—*
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Lambert, Harold: *See—*
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Lambert, Roy E., to FMC Corporation. Composite bearing assemblies. 3,989,323, Cl. 308-74.000.

Lamberti, Vincent, to Lever Brothers Company. Sulfosuccinate derivatives as detergent builders. 3,989,700, Cl. 260-247.10E.

Lambin, Andre, to Fives-Cail Babcock. Installation for the continuous casting of a metal strand. 3,989,092, Cl. 164-260.000.

Lambregts, Antonius A., to Boeing Company, The. Thrust and flight path control decoupling system. 3,989,208, Cl. 244-182.000.

Landis, Franklin F.: *See—*
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Lang, Armin; and Liebert, Karl-Heinz, to Zahnradfabrik Friedrichshafen AG. Power steering with variable volume servo control. 3,989,120, Cl. 180-154.000.

Lang, Robert J.: *See—*
Greene, David F.; Lang, Robert J.; and Welty, Albert B., Jr., 3,989,798.

Lange, Gerhard; and Peche, Gerhard, to Siemens Aktiengesellschaft. Cold-cathode gas-discharge device. 3,989,973, Cl. 313-201.000.

Lange, Gerhard; and Peche, Gerhard, to Siemens Aktiengesellschaft. Surge voltage arrester. 3,989,985, Cl. 317-61.000.

Lange, Michael; and Naumann, Gunter, to Bayer Aktiengesellschaft. Process for the production of anion exchangers - amidoalkylation of crosslinked water insoluble aromatic-group containing polymers using esters of cyclic N-hydroxyalkylimides. 3,989,650, Cl. 260-2.10E.

Lantz, Andre: *See—*
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Larson, Daniel A., to Westinghouse Electric Corporation. High pressure mercury vapor discharge lamp containing bismuth iodide. 3,989,972, Cl. 313-229.000.

Larson, Robert W. Multiple cut feller. 3,989,074, Cl. 144-3.00D.

Latka, Henry C.; and Leveille, David J. Electronic timing device. 3,989,374, Cl. 355-69.000.

Lau, Gunther: *See—*
Collin, Heinrich; Mosburger, Hans; Lau, Gunther; and Brandl, Hermann Josef, 3,989,576.

Lauder, Robert B.: *See—*
Turley, Richard J.; Ozolins, Alexandre; and Lauder, Robert B., 3,989,773.

Lauterbach, William L., to United States Steel Corporation. Expansion shim for hot briquette roll segments. 3,989,441, Cl. 425-471.000.

Lavallee, Francois A.: *See—*
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Lazaroiu, Dumitru Felician; Sleiher, Sigmund; and Mihaiescu, Gheorghe Mihai, to Institutul de Cercetare si Proietare Pentru Industria Electrotechnica. Rotor for motors and the like. 3,989,969, Cl. 310-268.000.

Leavitt, Richard Irwin, to Mobil Oil Corporation. Water-soluble polymers and utilization thereof. 3,989,592, Cl. 195-29.000.

Lebow, Marvin E. Lighting system for compatible stereo viewer. 3,988,844, Cl. 40-130.00B.

Le Chatelier, Jacques: *See—*
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Lee, Chi-Long; and Marko, Ollie W., to Dow Corning Corporation. Olefinic siloxanes as platinum inhibitors. 3,989,667, Cl. 260-46.5UA.

Lee, Chi-Long; and Ronk, Gary M., to Dow Corning Corporation. Method of making a silicone elastomer and the elastomer prepared thereby. 3,989,668, Cl. 260-46.50G.

Lee, Chin K.; and Long, Margaret E., to R. J. Reynolds Tobacco Company. Aggregate of flocculated cells. 3,989,597, Cl. 195-56.000.

Lee, Herbert S.: *See—*
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Lee, Man Shek, to GTE Automatic Electric Laboratories Incorporated. Network with a single amplifier for simulating an FDNR circuit. 3,990,025, Cl. 333-80.00R.

Lee, Wenpo, to Volkswagenwerk Aktiengesellschaft. Mixture-drawing internal combustion engine. 3,989,020, Cl. 123-122.00H.

Lee, Wilson J.; Wilson, Clotis A., Sr.; Howell, Vincent E.; and Bunno, E. James, to Weyerhaeuser Company. Feed and alignment system for panels. 3,989,146, Cl. 214-8.5SS.

Leeds & Northrup Company: *See—*
Paschkis, Albert Ernst, 3,989,917.

Lees, John; and Taylor, Kenneth, to International Standard Electric Corporation. Wire heat treating apparatus. 3,989,923, Cl. 219-155.000.

Legatski, Lester K.: *See—*
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Lehfeldt, Erick. Auxiliary flush valve mechanism for toilet tanks. 3,988,786, Cl. 4-67.00A.

Leistritz, Hans Karl, to Anstalt fur Verbrennungsmotoren, Prof. Dr. h.c. Hans List. Thermic afterburning and muffling apparatus for internal combustion engines. 3,989,469, Cl. 23-277.00C.

Leisure Group, Inc., The: *See—*
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Lemery, Jean-Paul, to Carpano & Pons S.A. Fly fishing reel. 3,989,204, Cl. 242-84.50R.

Lenhard, Myron James; and Mammino, Joseph, to Xerox Corporation. Dye coated carrier with toner. 3,989,648, Cl. 252-62.10P.

Lentz, George Howard, to Bell Telephone Laboratories, Incorporated. Method and apparatus for uniquely encoding channels in a digital transmission system. 3,990,009, Cl. 325-40.000.

Lenz, John, to Havir Manufacturing Company. Coiled flywheel assembly. 3,988,947, Cl. 74-572.000.

Leonard, Willie Burt. Fluidic repeater. 3,988,966, Cl. 91-388.000.

Lesster, Laban E.; and Etkins, Robert, to Westinghouse Electric Corporation. Wave energy power generating breakwater. 3,989,951, Cl. 290-53.000.

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Levy, Leon M. Latent indicia carrier. 3,989,279, Cl. 283-8.00B.

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Lewis, Geoffrey Arthur, to Lucas Industries Limited. Fuel control system for gas turbine engine. 3,988,887, Cl. 60-39.16R.

Liberg, Lars-Olof, to Jonkopings Mekaniska Werkstads AB. System for and method of carrying out wash-draining, after-draining and the like. 3,989,070, Cl. 141-1.000.

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Light, Kenneth K.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred Hugo, to International Flavors & Fragrances Inc. Tricyclic alcohols and lithium salts thereof. 3,989,760, Cl. 260-617.00F.

Lightner, Gene E. Method and apparatus for spotting chromatographic elements. 3,988,921, Cl. 73-61.10C.

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Lilly Industries, Ltd.: *See—*
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Lin, Ching San; and Smith, James Thomas, to GTE Sylvania Incorporated. Superalloys containing nitrides and process for producing same. 3,989,559, Cl. 148-126.000.

Lin, Yeong S.; Liu, Chao N.; and Tang, Donald T., to International Business Machines Corporation. Cryptographic magnetic bubble domain memory. 3,990,060, Cl. 340-174.0TF.

Lindelov, Ernst Claes Goran; and Eriksson, Bjorn Sven Hilding, to U.S. Philips Corporation. Printing device comprising a distance roller. 3,988,984, Cl. 101-93.030.

Lindmayer, Joseph, to Solarex Corporation. Silicon solar energy cell having improved back contact and method forming same. 3,990,097, Cl. 357-30.000.

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Liotta, Lance A. Test method for separating and/or isolating bacteria and tissue cells. 3,989,591, Cl. 195-1.800.

Lioux, Jean, to La Precision Industrielle. Rotary hydraulic jack. 3,988,969, Cl. 91-420.000.

Lipani, Anthony F.: *See—*
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Lipschutz, Paul, to Societe d'Exploitation des Brevets Neiman. Cylinder lock. 3,988,911, Cl. 70-362.000.

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Littlehales, Gerald Claude: *See—*
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Liu, Shing-gong: *See—*
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Livoff, Arnoldo: *See—*
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Locker, David J., to Eastman Kodak Company. Silver halide photographic element containing blended grains. 3,989,527, Cl. 96-69.000.

Lockwood, Robert J.; and Roess, Richard H., to Upjohn Company, The. Catalyst for sprayable polyisocyanurate foam composition. 3,989,651, Cl. 260-2.5AW.

Lofgren, Lewis C.; and Farrow, Stephen E., to Kimberly-Clark Corporation. Patient extremity surgical drape. 3,989,040, Cl. 128-132.00D.

Lofquist, Robert Alden; and Haylock, John Christopher, to Allied Chemical Corporation. Tertiary amines, substituted piperidine, morpholine or piperazine containing fatty acid moieties to prevent ozone fading of nylon fibers. 3,989,455, Cl. 8-165.000.

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Logerot, Bernard: *See—*
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Lohr, Delmar F., Jr.; and Kay, Edward Leo, to Firestone Tire & Rubber Company, The. Stabilization of polybutadiene resin with metal salt. 3,989,657, Cl. 260-23.70M.

Long, Fred M.; and Sawyer, Willard H., to Exxon Research and Engineering Company. Process for preparing a heavy crude conversion catalyst. 3,989,645, Cl. 252-462.000.

Long, Margaret E., to R. J. Reynolds Tobacco Company. Aggregate of dried flocculated cells. 3,989,596, Cl. 195-56.000.

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Louden, William G. Dense paper and method of manufacturing. 3,989,416, Cl. 427-361.000.

Lovendahl, Norman H. Articulated boat trailers. 3,989,264, Cl. 280-401.000.

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Lucas Industries Limited: *See—*
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Lucius, John Edward; and Lightner, Linn Stephen, to AMP Incorporated. Means for mounting an electrical connector in a panel opening from either side of the panel. 3,989,343, Cl. 339-128.000.

Luisi, James A.; Padgett, Clarence W.; and Street, Dana C., to Rockwell International Corporation. High speed memory cell. 3,990,056, Cl. 340-173.00R.

Lumby, Roland John; and North, Bernard, to Joseph Lucas Limited. Method of forming a sintered ceramic product. 3,989,782, Cl. 264-56.000.

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Lundgren, Carl William, Jr.; and Travis, George Walter, to Bell Telephone Laboratories, Incorporated. Antenna with echo cancelling elements. 3,990,080, Cl. 343-782.000.

Lundquist, Ingemar H.; and Sundblom, Leif J., to Valleylab, Inc. Intravenous feeding pump timer. 3,989,913, Cl. 200-35.00R.

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Maass, Alfred R., to SmithKline Corporation. Uricosuric compositions and method of producing uricosuria and hypouricemia. 3,989,838, Cl. 424-275.000.

MacDonald, Hugh D., Jr.; and Tietz, Peter, to United States of America, Army. Projectile. 3,988,990, Cl. 102-49.700.

MacLennan, David Graham; Ousby, John Clark; Owen, Terence Robert; and Steer, David Charles, to Imperial Chemical Industries Limited. Microbiological production of protein. 3,989,594, Cl. 195-49.000.

Mader, Heinz B., to Bruggemann & Brand KG. Parachute with delayed opening. 3,989,207, Cl. 244-152.000.

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Melchior, Jean F. Improvement in methods of supercharging an engine, preferably a diesel engine in such supercharged engines, and in supercharging units for such engines. 3,988,894, Cl. 60-606.000.

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Namizaki, Hirofumi; and Ito, Akiko, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor luminescent device. 3,990,096, Cl. 357-18.000.
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Nathanson, Harvey C.; Guldberg, Jens; and Muss, Daniel R., to Westinghouse Electric Corporation. Optical imaging system utilizing a light valve array and a coupled photoemissive target. 3,989,890, Cl. 178-7.30D.
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Neal, John A., to Georgia-Pacific Corporation. Process for recovery of dissolved mercury salts from aqueous solutions. 3,989,623, Cl. 210-28.000.
Neidigh, Robert, to Wheelabrator-Frye, Inc. Apparatus for converting solar energy into mechanical energy. 3,989,417, Cl. 417-379.000.
Neitzel, Walter, to J. M. Voith GmbH. Apparatus for pulping and grading of waste paper. 3,989,197, Cl. 241-43.000.
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Newman, Douglas A., to Columbia Ribbon and Carbon Manufacturing Co., Inc. Continuous copying method. 3,989,569, Cl. 156-234.000.
Newmark, Harold Leon: *See*—
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Nickell, Louis G., to Hawaiian Sugar Planters' Association. Use of polycyclic thiophene compounds as ripeners for sugarcane. 3,989,505, Cl. 71-90.000.
Niculescu-Duvaz, Ion; Feyns, Liviu Valentin; Suster, Dan; and Ciustea, Gheorghe, to Institutul Oncologic. Process of preparing N[p- [(2,4-diamino-6-pteridyl)-methyl]N[10]-methylamino -benzoyl]-glutamic acid. 3,989,703, Cl. 260-251.500.
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NL Industries, Inc.: *See—*
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Noe, Oskar; and Berger, Heinz Wilhelm, to BGW Bergwerk-und Walzwerk Maschinenbau G.m.b.H. Apparatus for winding and unwinding a band. 3,989,202, Cl. 242-72.00R.

Noguchi, Haruo; and Reinhard, Max, to Colortronic Reinhard & Co. K.G.; and Colortronic Co., Ltd. Process for continuous metering and mixing. 3,989,229, Cl. 259-8.000.

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Nose, Yoshiharu; Fukushima, Toshiyuki; Matsuzaki, Yukio; and Uemura, Hiroshi, to Nippon Oil Company Ltd. Method of preventing corrosion of steelworks. 3,989,459, Cl. 21-2.70R.

Notari, Bruno; and Rivola, Luigi, to Snam Progetti S.p.A. Process for the production of aluminum chlorohydroxides having a controlled chlorine content. 3,989,805, Cl. 423-462.000.

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O'Connor, Hubert P.: *See—*
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O'Connor, Thomas J. Structure for total form abrasion machining. 3,988,862, Cl. 51-157.000.

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O'Daniel, Philip S., Sr. Stethoscope transducer. 3,989,895, Cl. 179-1.0ST.

O'Doherty, George Oliver Plunkett, to Eli Lilly and Company. Control of animal parasites with ring-substituted N-(2,2-difluoroalkanoyl)-O-phenylenediamines. 3,989,840, Cl. 424-300.000.

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Okamoto, Haruo; and Yanagisawa, Isao, to Shinetsu Chemical Company. Process for the preparation of cyclic polydiorganosiloxanes. 3,989,733, Cl. 260-448.20E.

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Oki, Tsuguaki; Sudo, Masatoshi; Tsutsumi, Hiromori; Hosomi, Koji; Tsukatani, Ichiro; and Takahara, Teruyuki, to Kobe Steel Ltd. Process for producing maraging-steel cylinder for uranium enriching centrifugal separator and cylinders produced thereby. 3,989,553, Cl. 148-12.300.

Okuda, Yukio: *See—*
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Okuhara, Shinzi; Ohhinata, Ichiro; and Kusano, Masaaki, to Hitachi, Ltd. Semiconductor integrated circuits and method of manufacturing the same. 3,990,102, Cl. 357-49.000.

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Oliverius, Maynard F. Method for enclosing a contaminated article in a sterile container. 3,988,873, Cl. 53-27.000.

Olstowski, Franciszek, to Dow Chemical Company, The. Solid, rapid-setting rigid polyurethanes. 3,989,663, Cl. 260-33.20R.

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Onishi, Yasuhiko: *See—*
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Onnen, James H., to American Air Filter Company, Inc. Apparatus for controlling reaction conditions in a sulfur dioxide scrubber. 3,989,465, Cl. 23-260.000.

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Orlando, Charles M.; and Lavallee, Francois A., to General Electric Company. Fire-retardant polymeric compositions containing brominated biphenols. 3,989,531, Cl. 106-15.0FP.

Orlando, Joseph M.; Katz, Harry S.; and Rainford, Jack W., to Precision Dynamics Corporation. Method for producing an imprinting device. 3,989,570, Cl. 156-239.000.

Orshansky, Elias, Jr.: *See—*
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Orzel, Edward S., to Weatherhead Company, The. Brake booster with hydraulic ratio changer. 3,988,967, Cl. 91-391.00R.

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Osborne, Richard F., to W. R. Grace & Co. Method of heat sealing thermoplastic sheets together using a split laser beam. 3,989,778, Cl. 264-25.000.

Osheroff, Gene W., to Fluidtech Corporation. Air-conditioning system apparatus. 3,989,187, Cl. 236-13.000.

Ostrogovich, Claudio: *See—*
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Othmer, Donald F. Manufacture of titanium chloride and metallic iron from titaniferous materials containing iron oxides. 3,989,510, Cl. 75-1.00T.

Ourgant, Andre Pierre Joseph. Physical training apparatus. 3,989,241, Cl. 272-136.000.

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Pagen, Charles A.; and Petrucco, Richard J., to Mobil Oil Corporation. Production of lubricating oils blending stocks and selected components for asphalt production. 3,989,616, Cl. 208-6.000.

Paige, Peter M., to Holmes & Narver, Inc. Apparatus for contacting immiscible fluids. 3,989,467, Cl. 23-267.0MS.

Palac, Kazimir, to Zenith Radio Corporation. Method for manufacturing a color cathode ray tube using mask and screen masters. 3,989,524, Cl. 96-36.100.

Palffy nee Oswald, Maria: *See—*
Huhn, Magda; Tardos, Laszlo; Somfai, Eva; Resorszki, Gabor; Kovacs nee Mindler, Vera; and Palffy nee Oswald, Maria, 3,989,837.

Pallos, Ferenc M.; Brokke, Mervin E.; and Arneklev, Duane R., to Stauffer Chemical Company. Herbicidal antidote compositions with substituted oxazolidines and thiazolidines. 3,989,503, Cl. 71-88.000.

Palmer, Edwin. Method for encapsulating materials. 3,989,852, Cl. 426-289.000.

Palosi, Eva: *See—*
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Pan, Samuel C. Liquid-liquid extraction apparatus including fibrous strand packing. 3,989,466, Cl. 23-267.00R.

Pannier, Karl A., Jr.; Reynolds, Gordon S.; and Sorenson, James L., to Sorenson Research Co., Inc. Asceptic disposble rigid receiver for body drainage. 3,989,046, Cl. 128-276.000.

Pantages, Peter: *See—*
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Parker, Curtis Jess; and McGill, Kenneth Harmon, to Dresser Industries, Inc. Valve guide for poppet valve. 3,989,419, Cl. 417-454.000.

Parker, Dane K., to Goodyear Tire & Rubber Company, The. Preparation of antioxidants. 3,989,741, Cl. 260-486.00R.

Parker, Wallace R. Grain scatterer. 3,989,194, Cl. 239-666.000.

Pascaud, Xavier: *See—*
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Patterson, Charles A., Jr.; Winyard, Arthur H.; and Yurtin, John A., to General Motors Corporation. Printed circuit connector means. 3,989,332, Cl. 339-17.00C.

Paulik, Frank E.; Hershman, Arnold; Roth, James F.; and Craddock, John H., to Monsanto Company. Production of propionic acid. 3,989,748, Cl. 260-533.0AN.

Paulik, Frank E.: *See—*
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Paulson, Gerald Lee, to Bio-Technology Instruments Corporation. Reaction detection system. 3,989,383, Cl. 356-96.000.

Pavliichuk, Georgy Anatolievich: *See—*
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Peitl, Josef; Granitz, Fritz; Reithner, Gerhard; Dutzler, Wilhelm; Muller, Heinz; Bachner, Ernst; and Fortner, Walter, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Continuous casting plant for slabs. 3,989,093, Cl. 164-283.00S.

Pelosi, Michael E., Jr.; and Fink, Raymond. Gas filter and mounting. 3,989,491, Cl. 55-502.000.

Pelton, Donald A.: *See—*
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Pelton, Peter G., to Continental Group, Inc., The. Cylindrical pressure regulator. 3,989,061, Cl. 137-505.000.

Penczynski, Peter; Matthaus, Gunther; and Massek, Peter, to Siemens Aktiengesellschaft. Support body for the conductors of a low-temperature cable. 3,989,885, Cl. 174-15.00S.

Pepper, Kenneth V., to Genova, Inc. Compression fitting. 3,989,283, Cl. 285-323.000.

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Perlowski, Andrew A., to Honeywell Inc. Microprogram organization techniques. 3,990,054, Cl. 340-172.500.

Perry, Joseph A. Magnetic differential pressure switch. 3,989,911, Cl. 200-83.00L.

Perryman, John S. Apparatus and method for measuring muscular strength of lower human extremities. 3,988,931, Cl. 73-379.000.

Perusse, Edgar D.: *See—*
Smith, Jackson A.; and Perusse, Edgar D., 3,989,400.

Perusse Holdings Ltd.: *See—*
Smith, Jackson A.; and Perusse, Edgar D., 3,989,400.

Peruzzotti, George Peter: *See—*
Woessner, Warren Dexter; Arndt, Henry Clifford; Biddlecom, William Gerard; Peruzzotti, George Peter; and Sih, Charles John, 3,989,744.

Peterka, Vlastimil: *See—*
Prochazka, Karel; Novak, Jan; Simunek, Jaroslav; Peterka, Vlastimil; and Krob, Vaclav, 3,989,634.

Peters, Bruno: *See—*
Moll, Manfred; Bastin, Michel F.; and Peters, Bruno, 3,989,848.

Peters, Walter C.; Ghislain, Raymond L.; and Flick, Francis S., to Miller Fluid Power Corporation. Stop tube for cylinder assemblies. 3,988,968, Cl. 92-85.00A.

Petersen, Fritz: *See—*
Wiebke, Gunter; Korndorfer, Ludwig; Korndorfer, Eugen; Korsten, Andreas; Benecke, Theodor; and Petersen, Fritz, 3,989,883.

Peterson, Adrian J., to Black, Sivalls & Bryson, Inc. Packaged gas stream hydrocarbon dewpoint control apparatus. 3,989,487, Cl. 55-208.000.

Peterson, Francis C., to C. Hager & Sons Hinge Manufacturing Company. Entry structure and air-operated lock therefor. 3,988,859, Cl. 49-394.000.

Peterson, Philip C., to Peterson, Philip C. Motor powered watercraft for riding in standing position. 3,989,002, Cl. 115-70.000.

Peterson, William Anders, to Bell Telephone Laboratories, Incorporated. Frequency stabilized single-ended regulated converter circuit. 3,989,995, Cl. 321-2.000.

Petiet, Jakobus, to N.V. Leidsche Apparatenfabriek. Orientation device for subjects. 3,989,138, Cl. 198-384.000.

Petree, Edwyn H., to Western Electric Company, Inc. Apparatus for terminating a cable. 3,988,815, Cl. 29-33.00K.

Petrocarbon Developments Limited: *See—*
Jones, James Kevin, 3,989,478.

Petrucco, Richard J.: *See—*
Pagen, Charles A.; and Petrucco, Richard J., 3,989,616.

Pexton, Frederic Cyrus: *See—*
Berkman, John Worrall; and Pexton, Frederic Cyrus, 3,989,210.

Pfister, Arthur Franklin. Fuel metering means for charge forming devices for internal combustion engines. 3,989,022, Cl. 123-139.0AR.

Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., to Syntex (U.S.A.) Inc. Disubstituted xanthone carboxylic acid compounds. 3,989,720, Cl. 260-335.000.

Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., to Syntex (U.S.A.) Inc. Disubstituted xanthone carboxylic acid compounds. 3,989,721, Cl. 260-335.000.

Pfizer Inc.: *See—*
Schaaf, Thomas K., 3,989,736.

Phalan, James M., to Intel Corporation. Solid planar liquid crystal display with matching leads. 3,989,353, Cl. 350-160.0LC.

Phillipps, Gordon Hanley; and Marshall, David Robert, to Glaxo Laboratories Limited. Anaesthetic steroids of the androstane series and process for preparing same. 3,989,686, Cl. 260-239.55R.

Phillips, Donald E., to Rockwell International Corporation. Pulse count generator for wide range digital phase detector. 3,989,931, Cl. 235-92.0FQ.

Phillips Petroleum Company: *See—*
Henderson, Eulas W., 3,989,473.
Henderson, Eulas W., 3,989,803.
Scott, John N., Jr.; and Carrow, Guy E., 3,989,787.
Vanderveen, John W., 3,989,804.

Phillips, Robert C., to Raymond Lee Organization, Inc., The, a part interest. Artists device. 3,988,838, Cl. 33-274.000.

Picker Corporation: *See—*
Hunt, Robert P.; and Brinkman, Eugene V., 3,989,950.

Pielach, Alfred: *See—*
Wiedemann, Heinz; Pielach, Alfred; and Behre, Kurt, 3,989,172.

PIKAZ, inzenyrsky podnik: *See—*
Hladik, Oldrich; Ort, Vladimir; Pechar, Vladimir; Mickulecky, Miroslav; Zerzan, Ervin; and Prebinda, Bohumir, 3,989,562.

Pilkington Brothers Limited: *See—*
Dickinson, George Alfred; and Rhodes, William Jackson, 3,989,497.

Pillnik, Burton Frank, to American Can Company. Container end closure. 3,989,161, Cl. 220-273.000.

Pinchback, Tyrus R., to Wilson-Garner Company. Nut with asymmetric groove means. 3,989,082, Cl. 151-34.000.

Pinnert, Sylvie; Ninet, Leon; and Preud'Homme, Jean, to Rhone-Poulenc S.A. Antibiotic daunorubicin and its preparation. 3,989,598, Cl. 195-80.00R.

Pinson, George T.: *See—*
United States of America, National Aeronautics and Space Administration; Dubois, Robert D.; and Pinson, George T., 3,989,136.

Plan-Sell Oy: *See—*
Pyykonen, Niilo, 3,989,135.

Plastronics Corporation: *See—*
Gwilliam, James L., Jr.; and Cameron, Warde Mitchell, Jr., 3,989,142.

Platteschorre, Kornelis: *See—*
Davies, John R.; and Platteschorre, Kornelis, 3,989,575.

Plessey Handel und Investments A.G.: *See—*
Bennett, Jeffrey Henry, 3,990,010.

Plunguian, Mark; and Cornwell, Charles E. Foamed cementitious compositions and method of producing same. 3,989,534, Cl. 106-86.000.

Poduje, Noel S.: *See—*
Abbe, Robert C.; and Poduje, Noel S., 3,990,005.

Poe, L. Richard; Davis, Clifford A.; and Bourne, William R., Jr., to Hartwell Corporation. Readily mounted separable fastener. 3,988,808, Cl. 24-73.00P.

Poignant, Jean-Claude: *See—*
Malen, Charles; Roger, Pierre; Poignant, Jean-Claude; and Pascaud, Xavier, 3,989,834.

Polaroid Corporation: *See—*
Gross, Thomas A. O., 3,989,361.

Pollock, Charles B.: *See—*
Talmi, Yair; and Pollock, Charles B., 3,988,919.

Polson, Alfred, to South African Inventions Development Corporation. Influenza virus vaccine. 3,989,818, Cl. 424-89.000.

Polva-Nederland N.V.: *See—*
Acda, Petrus Marinus, 3,989,440.

Polysius AG: *See—*
Ritzmann, Horst; and Wohlfarth, Johannes Paul, 3,989,482.

Pomper, A. W.: *See—*
Gasior, Joseph; and Pomper, A. W., 3,989,941.

Poot, Albert Lucien; Van Besauw, Jan Frans; and Clement, Frans, to AGFA-GEVAERT N.V. Manufacture of a planographic printing plate by making silver halide areas of emulsion oleophicic. 3,989,522, Cl. 96-33.000.

Porsche Aktiengesellschaft: *See—*
Weiner, Hans, 3,989,954.

Porter, Edwin C., III, to Hughes Aircraft Company. DC linear power amplifier. 3,990,020, Cl. 330-207.00P.

Powell, Elizabeth S.: *See—*
Powell, Robert B.; and Powell, Elizabeth S., 3,988,809.

Powell, F. Luther: *See—*
Merchant, Philip, Jr.; Ohaji, Cosmas O.; and Powell, F. Luther, 3,989,460.

Powell, Robert B.; and Powell, Elizabeth S. Shoulder strap retainer. 3,988,809, Cl. 24-85.00R.

Power Controls, Corporation (Entire): *See—*
Wall, Bill R., 3,990,033.

Powers, Harold C.: *See—*
Walker, Donald F.; Bjerk, Roger O.; and Powers, Harold C., 3,989,425.

Prebinda, Bohumir: *See—*
Hladik, Oldrich; Ort, Vladimir; Pechar, Vladimir; Mickulecky, Miroslav; Zerzan, Ervin; and Prebinda, Bohumir, 3,989,562.

Precision Dynamics Corporation: *See—*
Orlando, Joseph M.; Katz, Harry S.; and Rainford, Jack W., 3,989,570.

Prescott, Roger: *See—*
Joo, Louis A.; Prescott, Roger; Sharpe, Gordon E.; and Snodgrass, Frank E., 3,989,802.

Preston, George Patrick, to Imperial Group Limited. Apparatus for the distribution of loose fibrous material. 3,989,309, Cl. 302-13.000.

Preud'Homme, Jean: *See—*
Pinnert, Sylvie; Ninet, Leon; and Preud'Homme, Jean, 3,989,598.

Price, Albert E.; and Mowatt-Larssen, Erling, to General American Transportation Corporation. Support for interconnection hose. 3,989,059, Cl. 137-347.000.

Primex Equipment Company: *See—*
Sumida, Kunio A., 3,988,829.

Prince, Leon M., to Lever Brothers Company. Quick lathering toilet bars and method of making same. 3,989,647, Cl. 252-535.000.

Princeton University: *See—*
Taylor, Edward C.; and Martin, Stephen F., 3,989,691.

Principe, Pacifico A.: *See—*
Stiller, Eric T.; Levine, Seymour D.; Principe, Pacifico A.; and Diassi, Patrick A., 3,989,841.

Prinz, Richard; Elghani, Salah Elabd; Fischer, Winfried; and Alberts, Heinrich, to Bayer Aktiengesellschaft. Thermoplastic moulding compositions. 3,989,770, Cl. 260-873.000.

Prochazka, Karel; Novak, Jan; Simunek, Jaroslav; Peterka, Vlastimil; and Krob, Vaclav, to Tukovy prumysl, oborove reditelstvi. Detergent containing a tenside with activating power. 3,989,634, Cl. 252-89.00R.

Procter & Gamble Company, The: *See—*
Bradley, William Jack; and Marsan, Mario Stephen, 3,989,638.
Marsan, Mario S., 3,989,631.
Martin, James Bruce, 3,989,728.
Sisson, James Bryant, 3,989,867.

Prodger, Brian S.: *See—*
Crabtree, Alfred A.; Prodger, Brian S.; and O'Connor, Hubert P., 3,988,855.

Products Research & Chemical Corporation: *See—*
Morris, Lester; and Perkins, Dennis, 3,989,228.

Produits Chimiques Ugine Kuhlmann: *See—*
Chabert, Pierre; Foulletier, Louis; and Lantz, Andre, 3,989,843.

Projectus Industripdukter AB: *See—*
Gustafsson, Berth Ulrik, 3,989,183.

Proni, Antonio: *See—*
Roggero, Arnaldo; Mazzei, Alessandro; and Proni, Antonio, 3,989,642.

Pruett, Vernon E. Adjustable means connecting a deck member to a support. 3,989,219, Cl. 249-24.000.

Pryor, David Ernest: *See—*
Forsyth, Bruce Adam; and Pryor, David Ernest, 3,989,826.

Puetz, Juergen; Rawinsky, Oskar; and Wagner, Heinz, to Siemens Aktiengesellschaft. Interference suppression feed-through capacitor. 3,989,988, Cl. 317-260.000.

Pugh, Emerson W., to International Business Machines Corporation. Gapless propagation structures for magnetic bubble domains. 3,990,061, Cl. 340-174.0TF.

Pullman Incorporated: *See—*
Carr, George W., 3,989,294.
Hutchison, John W., 3,988,801.
Schuller, James J., 3,989,288.

Purdue Research Foundation: *See—*
Whistler, Roy L., 3,989,822.

Purdy, David L.; Shapiro, Zalman M.; Hursen, Thomas F.; and Maurer, Gerould W., to ARCO Medical Products Company. Thermoelectric generator with hinged assembly for fins. 3,989,546, Cl. 136-202.000.

Purdy, David L.; Shapiro, Zalman M.; Hursen, Thomas F.; and Maurer, Gerould W., to ARCO Medical Products Company. Thermoelectric generator having a resiliently mounted removable thermoelectric module. 3,989,547, Cl. 136-205.000.

Purinton, Edwin C.; Holzinger, Carl S.; and Auger, Robert, to Magnavox Company, The. Theft detection system. 3,990,065, Cl. 340-280.000.

Pursnani, Khiman K.: *See—*
Russell, William J.; Pursnani, Khiman K.; and Ochsner, Rolf H., 3,989,910.

Pye, David S.: *See—*
Fischer, Paul W.; Pye, David S.; and Gallus, Julius P., 3,989,632.

Pyykonen, Niilo, to Plan-Sell Oy. Apparatus for single feeding timber. 3,989,135, Cl. 198-461.000.

Quackenbush, Robert C. Tool feeding device having signal control feed clutch. 3,989,405, Cl. 408-11.000.

Quantel Limited: *See—*
Stalley, Anthony Donald; and Coffey, John Albert, 3,990,103.

Quick, Leonard M.: *See—*
McCollum, John D.; and Quick, Leonard M., 3,989,618.

R. A. Jones & Company, Inc.: *See—*
Greenwell, Joseph Daniel, 3,988,960.

R. J. Reynolds Tobacco Company: *See—*
Lee, Chin K.; and Long, Margaret E., 3,989,597.
Long, Margaret E., 3,989,596.

Raab, Gunter; and Zeuch, Klaus, to Siemens Aktiengesellschaft. Method for detecting a leak in a reaction tube when forming a IIIA-VB compound. 3,988,920, Cl. 73-40.700.

Raffa, Jerry, to Raymond Lee Organization, Inc., The, a part interest. Puzzle employing movable member in tubular maze. 3,989,255, Cl. 273-153.00R.

Ragsdale, Herman Frank: *See—*
Medlock, Harold Gene; and Ragsdale, Herman Frank, 3,989,110.

Raible, Donald A.: *See—*
Bentley, Donald J.; and Raible, Donald A., 3,989,626.

Rainford, Jack W.: *See—*
Orlando, Joseph M.; Katz, Harry S.; and Rainford, Jack W., 3,989,570.

Rains, Sidney E.: *See—*
Hertel, Douglas L.; and Rains, Sidney E., 3,989,793.

Rajadhyaksha, Vithal Jagannath, to Nelson Research & Development Company. Novel N-bis-azacyclopentan-2-onyl alkanes. 3,989,815, Cl. 424-60.000.

Rajadhyaksha, Vithal Jagannath, to Nelson Research & Development Company. Vehicle composition containing 1-substituted azacycloheptan-2-ones. 3,989,816, Cl. 424-60.000.

Ralph, Hugh Ivor: *See—*
Lacklison, David Edward; Page, John Lincoln; Ralph, Hugh Ivor; and Scott, George Blair, 3,989,352.

Ralston Purina Company: *See—*
Hawley, Robert Lyle; and Tuley, William Bayard, 3,989,851.

Ram-Glas Products, Inc.: *See—*
Foley, John D., Jr., 3,989,000.

Ramberg, Kjell Oystein, to Simrad A.S. Method and means for recording of information. 3,990,082, Cl. 346-1.000.

Randerson, Keith, to British Steel Corporation. Heat treatment of steel. 3,989,231, Cl. 266-114.000.

Rank Industries Ltd.: *See—*
Smith, Jackson A.; and Perusse, Edgar D., 3,989,400.

Rank Organisation Limited, The: *See—*
Barron, Colin; and Turpin, Stephen John, 3,989,493.

Rank Xerox, Ltd.: *See—*
Namba, Yoshiharu, 3,989,369.
Yoshizawa, Masataka; and Fujita, Yasuhiro, 3,989,926.

Ranks Hovis McDougall Limited: *See—*
Bull, Duncan C.; and Solomons, Gerald L., 3,989,599.

Rasmussen, William P. Method for coating the impact surface of a golf club head. 3,989,861, Cl. 427-180.000.

Rasquin, Werner: *See—*
Friedrich, Jurgen; Friesenhagen, Engelbert; and Rasquin, Werner, 3,989,884.

Rathmell, Richard K. Molded hinged and corrugated ski boot. 3,988,842, Cl. 36-121.000.

Ravera, Giovanni; and Siletto, Giorgio, to Ing. C. Olivetti & C., S.p.A. Device for positioning and covering documents in a reprographic machine. 3,989,376, Cl. 355-75.000.

Rawinsky, Oskar: *See—*
Puetz, Juergen; Rawinsky, Oskar; and Wagner, Heinz, 3,989,988.

Rawn, Kenneth Lyle, to Lawrence Peska Associates, Inc., a part interest. Anti-jack knife system for trailer trucks. 3,989,268, Cl. 280-432.000.

Ray, Neil Hunter; Robinson, William Derek; and Lewis, Cyril John, to Imperial Chemical Industries Limited. Anti-misting inorganic oxide glass compositions. 3,989,532, Cl. 106-47.00Q.

Ray, Ranjan: *See—*
Tanner, Lee E.; Ray, Ranjan; and Cline, Carl F., 3,989,517.

Raymond, Joseph H., Jr. Electronic calculator or digital processor chip with combined functions for constant, keyboard and control bit. 3,989,939, Cl. 235-156.000.

Raymond Lee Organization, Inc., The: *See—*
Escamilla, Gus, 3,988,957.
Mattson, Alvin D., 3,989,252.
Meyer, C. Leonard, 3,989,427.
Phillips, Robert C., 3,988,838.
Raffa, Jerry, 3,989,255.
Smiley, Robert W., 3,989,265.

Raytheon Company: *See—*
Brown, William C., 3,989,994.

Razorenov, Vladimir Alexandrovich: *See—*
Khaidurov, Efim Leontievich; Razorenov, Vladimir Alexandrovich; Bulanov, Sergei Sergeevich; and Gorbov, Oleg Mikhailovich, 3,988,963.

RCA Corporation: *See—*
Ahmed, Adel Abdel Aziz, 3,989,997.
Ahmed, Adel Abdel Aziz, 3,990,017.
Busanovich, Charles John; and Moore, Robert Milton, 3,990,095.
Digneffe, Henri Joseph, 3,990,000.
Duigon, Ferdinand Carl; and Liu, Shing-gong, 3,990,099.
Ettenberg, Michael; and Kressel, Henry, 3,990,101.
Hudson, Kenneth Clifford; and Kenville, Richard Francis, 3,989,348.
McNeely, Michael Lee; and Rees, Herbert, 3,989,436.
Wardell, Myron Henry, Jr., 3,989,233.

Redding, James V.: *See—*
Busch, Albert E.; Hotsenpiller, John R.; and Redding, James V., 3,989,888.

Reece, Oscar G. Internal combustion engine fuel charge treatment. 3,989,017, Cl. 123-119.00E.

Reed Irrigation Systems: *See—*
Zimmerman, Harry M., 3,989,282.

Reed, Stephen A., III: *See—*
Cangiano, Frank; Reed, Stephen A., III; Boule, Wilfred L.; and Dayton, David R., 3,989,549.

Reed Tool Company: *See—*
Murdoch, Henry W., 3,989,315.

Reedy, Marvin E.; and Shook, Roy D., to Harding, Gary; and Garfield, Patricia, part interest to each. Protective sink cover. 3,988,784, Cl. 4-1.000.

Rees, Herbert: *See—*
McNeely, Michael Lee; and Rees, Herbert, 3,989,436.

Refrigerated Products, Inc.: *See—*
Brewer, Jimmy Milton; and Tindle, John Thomas, 3,988,903.

Regie Nationale des Usines Renault: *See—*
Rivere, Jean-Pierre, 3,989,015.

Regner, Richard; and Schug, Gerd, to Hoechst Aktiengesellschaft. Method for shirring casings. 3,988,804, Cl. 17-45.000.

Reichel, Kurt: *See—*
Brandstetter, Walter; Decker, Gerd; and Reichel, Kurt, 3,989,014.

Reichel, Pavel: *See—*
Voboril, Bohuslav; Reichel, Pavel; and Kafunek, Pavel, 3,989,095.

Reifenhauser KG: *See—*
Brunnhofer, Erwin, 3,989,779.

Reiff, Helmut: *See—*
Neumaier, Hermann; Noll, Klaus; and Reiff, Helmut, 3,989,869.

Reiff, Karl H., to Haas, Carl. Alloys for tension bands. 3,989,515, Cl. 75-172.00R.

Reinartz, Hans-Dieter, to ITT Industries, Inc. Compensating reservoir for a multi-circuit hydraulic brake system. 3,989,056, Cl. 137-574.000.

Reinhard, Max: *See—*
Noguchi, Haruo; and Reinhard, Max, 3,989,229.

Reinsma, Harold L.; McFeeters, Robert D.; and Linne, Terry D., to Caterpillar Tractor Co. Wheel of track assembly of a crawler type vehicle. 3,989,314, Cl. 305-28.000.

Reitboeck, Heribert J. P., to Westinghouse Electric Corporation. Method and apparatus for speech identification. 3,989,896, Cl. 179-1.05B.

Reith, Robert A.; and Spanswick, James, to Standard Oil Company (Indiana). Rubbermodified styrene polymers. 3,989,771, Cl. 260-880.00R.

Reithner, Gerhard: *See—*
Peitl, Josef; Granitz, Fritz; Reithner, Gerhard; Dutzler, Wilhelm; Muller, Heinz; Bachner, Ernst; and Fortner, Walter, 3,989,093.

Remmert, Josef, to Bernhard Beumer Maschinenfabrik KG. Apparatus for attaching valve bags to filling spouts of filling machines. 3,989,073, Cl. 141-315.000.

Rendessy, William L. Sway control devices utilizable in conjunction with equalizer hitches. 3,989,269, Cl. 280-446.00B.

Renfrew, Edgar Earl; and Zanella, Dominic Andrew, to American Color & Chemical Corporation. Thermofix process for the dyeing of polyester fibers. 3,989,451, Cl. 8-41.00C.

Rengert, Thomas A.: *See—*
Bowler, Edward F., Jr.; and Rengert, Thomas A., 3,989,005.

Renirie, Alexis C. M.; and Weijs, Godefridus J. M., to Vitatron Medical B.V. Low current drain amplifier with sensitivity adjustment means. 3,989,958, Cl. 307-235.00N.

Renirie, Alexis C. M.; Weijs, Godefridus J. M.; and Schuimer, Jan P., to Vitatron Medical B.V. Low current drain amplifier incorporating feedback means for establishing sensitivity. 3,989,959, Cl. 307-235.00N.

Renner Company, The: *See—*
James, W. Thomas, III, 3,989,402.

Reppert, Merlyn R., to W. R. Grace & Co. Stamped automotive wheel. 3,989,307, Cl. 301-64.00R.

Republic Tool & Manufacturing Corporation: *See—*
McRoskey, John W.; Swartz, Delbert D.; and McRoskey, Leonard H., 3,989,153.

Research Corporation: *See—*
Subramanian, Gopal; and McAfee, John Gilmore, 3,989,730.

Resorszki, Gabor: *See—*
Huhn, Magda; Tardos, Laszlo; Somfai, Eva; Resorszki, Gabor; Kovacs nee Mindler, Vera; and Palffy nee Oswald, Maria, 3,989,837.

Reuel, Hermann: *See—*
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Revertex Ltd.: *See—*
Bondy, Clemens, 3,989,661.

Revlon, Inc.: *See—*
Seidler, David, 3,989,392.

Reynolds, Gordon S.: *See—*
Pannier, Karl A., Jr.; Reynolds, Gordon S.; and Sorenson, James L., 3,989,046.

Rhodes, William Jackson: *See—*
Dickinson, George Alfred; and Rhodes, William Jackson, 3,989,497.

Rhone-Poulenc Industries: *See—*
Florent, Lean; Lunel, Jean; and Mancy, Denise, 3,989,820.

Rhone-Poulenc S.A.: *See—*
Pinnert, Sylvie; Ninet, Leon; and Preud'Homme, Jean, 3,989,598.

Rhone-Poulenc-Textile: *See—*
Guillermin, Rene; Joly, Jean; and Sangalli, Sylvio, 3,988,882.

Ricci, Louis N.: *See—*
Farley, James R.; Salvati, John G.; and Ricci, Louis N., 3,989,986.

Rice, Edwin E.: *See—*
Seccombe, Robert J.; Rice, Edwin E.; Hurtubise, William F.; and Mudge, Ronald K., 3,988,925.

Richards Manufacturing Company, Inc.: *See—*
Treace, James T., 3,988,783.

Richardson-Merrell Inc.: *See*—
Bambury, Ronald E.; Edwards, Michael L.; and Miller, Laird F., 3,989,687.
Richter Gedeon Vegyeszeti Gyar Rt.: *See*—
Toth, Edit; Torley, Jozsef; Palosi, Eva; Szeberenyi, Szaboles; Szporny, Laszlo; Gorog, Sandor; and Meszaros, Csilla, 3,989,701.
Richter, James Douglas: *See*—
Fay, Charles Robert; and Richter, James Douglas, 3,989,937.
Ridenour, Oscar E.: *See*—
Gorenflo, Donald L.; Hendershot, Dick D.; and Ridenour, Oscar E., 3,989,094.
Rieber, Roland; and Fassbender, Rolf, to Zahnradfabrik Friedrichshafen AG. Pump for servo steering. 3,989,414, Cl. 417-300.000.
Riechers, Daniel: *See*—
Haberle, Fritz; and Riechers, Daniel, 3,989,293.
Riedel-de Haen Aktiengesellschaft: *See*—
Hirsch, Wolfgang, 3,989,462.
Riedel, Tilo, to S.A. Etablissements Francois Salomon & Fils. Automatic brake for ski. 3,989,271, Cl. 280-605.000.
Riemenschneider, Wilhelm; and Wegener, Peter. Process for the preparation of oxamide. 3,989,753, Cl. 260-561.00K.
Right, Robert W.: *See*—
Budrys, Ignas; and Right, Robert W., 3,989,908.
Ringe, Stephen J., to Fruehauf Corporation. Door hardware. 3,989,289, Cl. 292-241.000.
Ritchie, James A., to Caterpillar Tractor Co. Housing construction for slant axis rotary mechanism. 3,989,421, Cl. 418-53.000.
Ritchie, James A.: *See*—
Goloff, Alexander; Barker, Noble G.; and Ritchie, James A., 3,989,424.
Rittler, Hermann L., to Corning Glass Works. Spontaneously-formed glass-ceramics containing barium and/or strontium iron silicate crystals. 3,989,496, Cl. 65-33.000.
Ritzmann, Horst; and Wohlfarth, Johannes Paul, to Polysius AG. Method for the removal of dust from exhaust gases. 3,989,482, Cl. 55-4.000.
Rivere, Jean-Pierre, to Regie Nationale des Usines Renault. Distribution apparatus for an internal combustion engine with stratified charge. 3,989,015, Cl. 123-75.00B.
Rivola, Luigi: *See*—
Notari, Bruno; and Rivola, Luigi, 3,989,805.
Rizzio, Michael, Jr.; and Janzow, Richard C., to Molex Incorporated. Flexible circuit connector assembly. 3,989,336, Cl. 339-74.00R.
Rizzo, Dominick; and Conway, Richard J., to Atlantic Elevator Corporation. Vandal proof interlock switch. 3,989,123, Cl. 187-48.000.
Robar, James D. J.; Glass, David G.; and Barrett, Almand O., to Sed Systems Ltd. Fluid conductivity measurement apparatus. 3,989,009, Cl. 119-14.080.
Robert Bosch Fernsehanlagen G.m.b.H.: *See*—
Gunschmann, Peter, 3,990,110.
Robert Bosch G.m.b.H.: *See*—
Adalbert, Gerhard; Dettling, Hubert; and Hess, Jurgen, 3,989,490.
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Robertson, Arthur B.; Schaffhauser, Robert J.; Lupton, Elmer C.; and Miller, William A., to Allied Chemical Corporation. Fluoropolymer primer compositions. 3,989,873, Cl. 428-422.000.
Robertson, James H. Life preserver. 3,988,795, Cl. 9-338.000.
Robillard, Jean Jules Achille. Process for recording phase holograms using energy-activated sensitizer. 3,989,530, Cl. 96-27.00H.
Robinson, Glen P., Jr.: *See*—
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Roggero, Arnaldo; Mazzei, Alessandro; and Proni, Antonio, to Snam Progetti S.p.A. Polymerization catalyst. 3,989,642, Cl. 252-431.00N.
Rohm and Haas Company: *See*—
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Rosen, Harold A., to Hughes Aircraft Company. Dynamic balancer for spinning bodies. 3,988,935, Cl. 73-458.000.
Ross, Robert R., to H. A. Phillips & Co. Refrigeration system. 3,988,904, Cl. 62-174.000.
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Rudolph, Hans; Bockmann, August; Goerden, Leonhard; Walter, Oskar; and Schulz-Walz, HansJochen, to Bayer Aktiengesellschaft. Low shrink, free flowing polyester resin systems based on a mixture of a crystalline unsaturated polyester resin, a monomeric copolymerizable component and a cellulose ester. 3,989,655, Cl. 260-16.000.
Rue, Max; Ehemann, Horst; and Lummerzheim, Konrad, to Audi NSU Auto Union Aktiengesellschaft; and Wankel GmbH. Piston of light metal for a rotary piston combustion engine. 3,989,423, Cl. 418-61.00A.
Rueckl, Roger L., to United States Steel Corporation. Production of powder metallurgical parts by formation of sintered preforms in thermally degradable molds. 3,989,518, Cl. 75-211.000.
Ruegg, Rudolf; and Schwieter, Ulrich, to Hoffmann-La Roche Inc. Monoacetals of unsaturated aliphatic dialdehydes. 3,989,758, Cl. 260-602.000.
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Sable, Harvey James, to Addressograph Multigraph Corporation. Device for drying the surface of a blanket cylinder of ink washing solvent. 3,988,988, Cl. 101-425.000.
Sacharnoski, Max, Sr. Fishing lure sound producer. 3,988,851, Cl. 43-42.310.
Sachs, Jean-Pierre; and Six, Jean-Claude, to U.S. Philips Corporation. Burst transmission control system. 3,990,047, Cl. 340-167.00R.
Sachser, Herbert, to Albert Schulte Sohne KG. Caster for furniture and the like. 3,988,800, Cl. 16-35.00R.
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Sakamoto, Nobukazu: *See*—
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Salger, Werner, to Lumoprint Zindler KG. Apparatus for replenishing toner in the development system of a copying machine. 3,989,168, Cl. 222-165.000.

Salgo, Leslie, to Imperial Oil Limited. Winding apparatus. 3,989,582, Cl. 156-542.000.

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Salomon, Georges Pierre Joseph, to S.A. Etablissements Francois Salomon & Fils. Ski-boot. 3,988,841, Cl. 36-117.000.

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Sangalli, Sylvio: *See—*
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Sanjana, Zal N., to Westinghouse Electric Corporation. Glass-epoxy laminates for high temperature use. 3,989,573, Cl. 156-330.000.

San Miguel, Anthony, to United States of America, Navy. Method for fabricating a consumable cartridge casing. 3,989,792, Cl. 264-325.000.

Santilli, Vincent J.; and Vine, James, to Westinghouse Electric Corporation. Gateable electron image intensifier. 3,989,971, Cl. 313-99.000.

Santo, Charles P. Quick disconnect battery. 3,989,544, Cl. 429-65.000.

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Sasamori, Soichiro, to Dia Medical System Co., Ltd. Biophysical electrode. 3,989,036, Cl. 128-2.06E.

Sasse, Klaus; Beck, Gunther; and Eue, Ludwig, to Bayer Aktiengesellschaft. Certain 2-mercapto-4,5-dichloro-thiazole compounds. 3,989,710, Cl. 260-302.00H.

Sato, Masayuki; Fujisawa, Fumio; and Kawashima, Kenichi, to Hitachi, Ltd. Vane pump. 3,989,426, Cl. 418-138.000.

Sato, Takao: *See—*
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Sato, Tomoari: *See—*
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Sato, Toshio: *See—*
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Sato, Toshiyuki, to Kabushiki Kaisha Suiken. Apparatus for inserting small-diameter pipe into large-diameter pipe and/or pulling the former out of the latter. 3,988,819, Cl. 29-237.000.

Satzinger, Gerhard; and Herrmann, Manfred, to Warner-Lambert Company. Method for treating cardiovascular circulatory insufficiencies and hypotonia with 2-hydroxyphenyl-1-oxa-4-azaspiroalkane derivatives. 3,989,836, Cl. 424-272.000.

Saucy, Gabriel, to Hoffmann-La Roche Inc. Tetrahydropyran-2-ols. 3,989,724, Cl. 260-345.900.

Saunders, George, to Lawrence Peska Associates, Inc., a part interest. Apparatus for metering and dispensing. 3,989,166, Cl. 222-48.000.

Sauseng, Otto; and Estrella, Kenneth A., to Hughes Aircraft Company. Coupled cavity traveling-wave tube with oblong cavities for increased bandwidth. 3,989,978, Cl. 315-3.500.

Savit, Carl H., to Western Geophysical Co. Multiplexing method and apparatus for telemetry of seismic data. 3,990,036, Cl. 340-15.5TS.

Sawaki, Mikio; Iwataki, Isao; Hirono, Yoshihiko; Ishikawa, Hisao; Yamada, Shozo; Yasuda, Yasushi; and Asada, Mitsuo, to Nippon Soda Company Limited. Herbicidal composition of 3,4-dihydro-2H-pyrane-2,4-diones and methods. 3,989,504, Cl. 71-88.000.

Sawaki, Mikio; Iwataki, Isao; Hirono, Yoshihiko; and Ishikawa, Hisao, to Nippon Soda Company Limited. 2-Cyclohexene-1-one derivatives. 3,989,737, Cl. 260-472.000.

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Scartazzini, Riccardo; and Bickel, Hans, to Ciba-Geigy Corporation. 7β-Amino-cepham-3-ol-4-carboxylic acid compounds. 3,989,695, Cl. 260-243.00C.

Schaaf, Thomas K., to Pfizer Inc. Prostaglandin 5-indanyl esters. 3,989,736, Cl. 260-468.00D.

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Schaufele, Robert F., to Owens-Illinois, Inc. Multiple gaseous discharge display/memory panel having decreased operating voltages. 3,989,982, Cl. 315-169.0TV.

Schelkmann, Wilhelm, to Vakuum Vulk Holdings Ltd. Method of retreading tires. 3,989,563, Cl. 156-96.000.

Schiemann, Heinz, to Siemens Aktiengesellschaft. Measuring transformer for installation in the metal enclosure of a switching installation. 3,990,001, Cl. 323-44.00R.

Schifman, Edward J., to Aladdin Industries, Incorporated. Game board apparatus. 3,989,253, Cl. 273-131.00B.

Schildknecht, Walter T., to Marshall Erdman and Associates, Inc. Dehumidification controls. 3,989,097, Cl. 165-21.000.

Schindehutte, Manfred, to Wegman & Co. High speed railway truck. 3,988,992, Cl. 105-199.0CB.

Schliep, Hans-Jochen: *See—*
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Schloemann-Siemag Aktiengesellschaft: *See—*
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Schmidt, Hans, to Marker, Hannes. Heel mounting device for ski binding. 3,989,273, Cl. 280-631.000.

Schmidt, Robert H., to Electro-Craft Corporation. Pulse width modulated control system. 3,989,992, Cl. 318-257.000.

Schmidt, Rudolph, to Triangle Tool Company. Method of making toothed lock washers. 3,988,796, Cl. 10-86.00B.

Schmitt, Charles R.: *See—*
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Schmitt, Karl; Disteldorf, Josef; and Flakus, Werner, to Veba-Chemie AG. Single component polyurethane varnish of long shelf life. 3,989,662, Cl. 260-31.20N.

Schmitz, Lawrence S.; and Drumheller, Warren D., to Westinghouse Electric Corporation. Solid state security system. 3,990,075, Cl. 340-420.000.

Schmitzberger, Franz, to Inteco Establishment. Device for forming tube sockets. 3,989,439, Cl. 425-392.000.

Schmuck, Fredric E.: *See—*
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Schneider, Eckart: *See—*
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Schneider, Paul W. Compact hair pick. 3,989,053, Cl. 132-11.00R.

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Schoepe, Adolf; and Schmuck, Fredric E. Valve seat and closure member assembly of flush valves for flush tanks and the like. 3,988,785, Cl. 4-57.00P.

Scholes, Addison B., to Ball Corporation. Apparatus for applying durable lubricous coatings to newly formed vitreous surfaces. 3,989,004, Cl. 118-48.000.

Schoppe, Wayne F.: *See—*
Jackson, Earl V.; Schoppe, Wayne F.; Squassoni, Gino F.; and Warter, Peter J., 3,989,367.

Schroder, Adolf; and Klauer, Hans Dieter, to Braun Aktiengesellschaft. Gas lighter. 3,989,071, Cl. 141-294.000.

Schug, Gerd: *See—*
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Schuller, James J., to Pullman Incorporated. Door lock for railway car sliding doors. 3,989,288, Cl. 292-213.000.

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Schuman, Mark. System for monitoring changes in the fluidic impedance or volume of an enclosure. 3,990,063, Cl. 340-240.000.

Schuman, Mark. System for monitoring changes in the fluidic impedance or volume of an enclosure. 3,990,069, Cl. 340-240.000.

Schutz, Siegismund; Behner, Otto; and Hoffmeister, Friedrich, to Bayer Aktiengesellschaft. Basic oximes and their preparation. 3,989,844, Cl. 424-327.000.

Schwarz, Ing. Walter. Pipe joint. 3,989,280, Cl. 285-21.000.

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Schwieter, Ulrich: *See—*
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Scott, George Blair: *See—*
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Scott, John N., Jr.; and Carrow, Guy E., to Phillips Petroleum Company. Method of rotational molding a thermosetting article with a thermoplastic insert. 3,989,787, Cl. 264-114.000.
Scragg, Robert L.; and Parker, Alfred B. Method and apparatus for cyclically controlling the energization of home water heaters. 3,989,928, Cl. 219-334.000.
Scriven, Albert K., Jr.; and Aulson, Michael F., to Speco, Inc. Sheet stacking apparatus. 3,989,239, Cl. 271-204.000.
Scudamore, Mark John: *See—*
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Seccombe, Robert J.; Rice, Edwin E.; Hurtubise, William F.; and Mudge, Ronald K., to Ingersoll-Rand Company. Valve lash adjusting tool and method therefor. 3,988,925, Cl. 73-119.00R.
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Seidler, David, to Revlon, Inc. Dispensing device. 3,989,392, Cl. 401-66.000.
Seifert, Hans-Gordon, to International Business Machines Corporation. Multiple flexible record storage disk apparatus having an access arm with enhanced disk stabilizing features. 3,990,109, Cl. 360-99.000.
Seki, Shinichiro: *See—*
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Seragnoli, Enzo, to G. D. Societa per Azioni. Device for sealing wrappers of candies and the like. 3,988,876, Cl. 53-124.00A.
Seragnoli, Enzo, to G. D. Societa per Azioni. Apparatus with a rotatable head for supplying cigarettes to the infeed hoppers on high speed cigarette packeting machines. 3,989,199, Cl. 214-302.000.
Sevick, Timothy A.: *See—*
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Shaw, Fred B.; and DuPuis, Clyde F., to Continental Can Company, Inc. Compartment bag for aerosol container. 3,989,165, Cl. 222-23.000.
Shea, John W., to United States of America, Navy. High-pressure, electrically initiated explosive igniter. 3,988,989, Cl. 102-28.00R.
Sheesley, Jay R., to Keystone Industries, Inc. Automotive vehicle door retarding and closing mechanism. 3,989,287, Cl. 292-201.000.
Sheinbaum, Itzhak. Power generation from hot brines. 3,988,895, Cl. 60-641.000.
Sheldon, Gary L., to Evans Products Company. Apparatus for forming envelopes. 3,989,579, Cl. 156-443.000.
Sheldon, Luther M.; and Maloof, Robert E., to General Electric Company. Insulator ramp clamp for connectors. 3,989,340, Cl. 339-193.00C.
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Hill, Earl S., 3,989,811.
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Shelly, William A., to Honeywell Information Systems, Inc. Memory steering in a data processing system. 3,990,051, Cl. 340-172.500.
Shelton, Samuel V.; and Robinson, Glen P., Jr., to Scientific-Atlanta, Inc. Dual loop heat pump system. 3,988,901, Cl. 62-116.000.
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Shim, Kyung S., to Stauffer Chemical Company. Polyalkylene glycol alkyl or haloalkyl polyphosphonates used as flame retardants in polyurethane foam. 3,989,652, Cl. 260-2.5AR.
Shima, Takeo: *See—*
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Shono, Tetsuji, to Asahi Kogaku Kogyo Kabushiki Kaisha. Measurement mode interlock mechanism in camera TTL light measuring system. 3,990,085, Cl. 354-46.000.
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Shutt, Dolores C. Self-examining genital mirror. 3,989,359, Cl. 350-288.000.
Sickmeier, Edgar W., to General Motors Corporation. Method and apparatus for vibration cleaning of workpieces such as engine blocks. 3,989,537, Cl. 134-1.000.
Siegmund, Walter P., to American Optical Corporation. Method of making optical prisms. 3,989,495, Cl. 65-31.000.
Sieja, Norman F.: *See—*
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Siemens Aktiengesellschaft: *See—*
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Simon, William N., to Snow Lion Corporation. Sleeping bag. 3,988,791, Cl. 5-343.000.
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Sinfelt, John H.; and Barnett, Allan E., to Exxon Research and Engineering Company. Novel gold-copper catalysts for the partial oxidation of olefins. 3,989,674, Cl. 260-604.00R.
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Skocypec, Russell; Crowther, Joseph C., Jr.; and Cimaroli, Richard J., to Vacudynealtair, Inc. Apparatus for use, recovery, reconstitution, and recyclization of sterilant gas mixture. 3,989,461, Cl. 21-91.000.
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Slezak, Istvan, to Intercooperation Kereskedelemfejlesztesi Rt. Equipment for the improvement of the efficiency of drying shelled maize. 3,988,976, Cl. 99-485.000.
Slowbe, Joseph A. Structural joint assembly. 3,989,399, Cl. 403-245.000.
Sluis, Maarten; and De Kruif, Jan H., to Shell Oil Company. Epoxy resin powder composition. 3,989,679, Cl. 260-78.410.
Smiley, Robert W., to Raymond Lee Organization, Inc., The, a part interest. Trailer for boat and motorcycle. 3,989,265, Cl. 280-414.00R.
Smith, Charles W., to GTE Sylvania Incorporated. Automated inspection apparatus and method. 3,989,386, Cl. 356-156.000.
Smith, David S., to Eastman Kodak Company. Exposure and heat development device. 3,989,377, Cl. 355-85.000.
Smith, Dexter William; and Lumby, Roland John, to Joseph Lucas (Industries) Limited. Method for producing a hot pressed component. 3,989,438, Cl. 264-332.000.
Smith, Fred T., to Sargent Industries, Inc. Front end loader. 3,988,979, Cl. 100-50.000.
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Smith, Richard W.; and Adamson, Gerald E., to Westinghouse Electric Corporation. Acoustic transducer with damping means. 3,989,965, Cl. 310-8.200.
Smith, Thomas R. Flexible coupling. 3,988,906, Cl. 64-12.000.
Smith, Thomas R. Drive belt. 3,988,941, Cl. 74-231.00R.
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Sparkes, Curtis A. Folding chairs. 3,989,295, Cl. 297-39.000.
Sparks, Robert; and Spector, George. Tracing scope. 3,988,833, Cl. 33-20.00C.
Sparr, Anders V., Sr. Fountain-type pipe cleaning brush. 3,989,388, Cl. 401-11.000.
Spatz, Sydney M., to Mead Corporation, The. Pyrrylfluoran compounds. 3,989,716, Cl. 260-326.340.
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Spence-Bate, Harry Arthur Hele. Photographic copying apparatus. 3,989,375, Cl. 355-70.000.
Spence, John R., to Rockwell International Corporation. Strobing scheme and keyboard sensing circuit for a one chip calculator. 3,990,070, Cl. 340-337.000.
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Spirill Corporation Ltd.: *See—*
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Spring, Edward F., Sr.; and Schaedler, Raymond J., to Chicago Pneumatic Tool Company. Pneumatic tool having a reverse air control valve with an integral regulator. 3,989,113, Cl. 173-163.000.

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Stacey, Eric J., to Westinghouse Electric Corporation. Force commutation static frequency changer apparatus using direct capacitor commutation. 3,989,996, Cl. 321-7.000.
Stach, Kurt: *See—*
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Stadler, Paul A.; Eschenmoser, Albert; and Sundt, Erling, to Firmenich S.A. Oxygenated decalin derivatives. 3,989,739, Cl. 260-486.00R.
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Stalley, Anthony Donald; and Coffey, John Albert, to Quantel Limited. Input oscillators for time base correctors. 3,990,103, Cl. 358-8.000.
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Stearley, Robert J., to Great Plains Bag Corporation. Vented bag. 3,989,182, Cl. 229-62.500.
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Steinman, Richard K. Fishing line tensioner and tackle holder. 3,988,850, Cl. 43-25.200.
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Stern, Julius Heinrich Johannes, deceased (by Stern, Erika, heir); Strauss, Werner; and Kohlmann, Albert, to Klockner-Humboldt-Deutz Aktiengesellschaft. Rotary distributor plate for a centrifugal air classifier. 3,989,620, Cl. 209-148.000.
Stiller, Eric T.; Levine, Seymour D.; Principe, Pacifico A.; and Diassi, Patrick A., to E. R. Squibb & Sons, Inc. Method of using fluorene-2-acetic acid derivatives. 3,989,841, Cl. 424-317.000.
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Strawson, Kenneth Horace; and Foden, Anthony, to Strawson Hydraulics (Consultants) Limited; and Balfour Darwins Limited. Method of making permanent magnets. 3,989,777, Cl. 264-24.000.
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Suzuki, Yasoji, to Tokyo Shibaura Electric Co., Ltd. Logic circuit arrangements using insulated-gate field effect transistors. 3,989,955, Cl. 307-205.000.

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Swanson, Floyd R., Jr., to Swanson Engineering Inc. Fluid pump for use in explosive bore holes. 3,989,418, Cl. 417-405.000.

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Sze, Benjamin Chiatse, to Du Pont de Nemours, E. I., and Company. Stretch-resistant bulked yarn. 3,988,883, Cl. 57-140.0BY.

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Szporny, Laszlo: *See—*
Toth, Edit; Torley, Jozsef; Palosi, Eva; Szeberenyi, Szaboles; Szporny, Laszlo; Gorog, Sandor; and Meszaros, Csilla, 3,989,701.

Szymber, Oleg, to GAF Corporation. Means for improving the contrast of an electrostatic latent image. 3,989,519, Cl. 96-1.00R.

Tabor, James B., to Westinghouse Electric Corporation. Solid-state hid lamp dimmer. 3,989,976, Cl. 315-291.000.

Tada, Takeo, to TDK Electronics Company, Limited. Magnet roller for electrostatic record developing device. 3,988,816, Cl. 29-116.00R.

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Takahashi, Minoru. Constant pressure heating vane rotary engine. 3,989,011, Cl. 123-8.150.

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Takasaki, Heishi. Built-in combination cooling and heating device. 3,989,098, Cl. 165-48.000.

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Takekoshi, Tohru; and Kochanowski, John E., to General Electric Company. Method for making polyetherimides. 3,989,670, Cl. 260-47.0CP.

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Takita, Nobuhiro, to Log Etronics Inc. System for controlling replenishment of developer solution in a photographic processing device. 3,990,088, Cl. 354-298.000.

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Talmi, Yair; and Pollock, Charles B., to United States of America, Energy Research and Development Administration. Use of graphitized carbon beads for gas liquid chromatography. 3,988,919, Cl. 73-23.100.

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Taylor, Philip W., to Taylor Industries, Inc. Wiring duct cover mounting assembly. 3,989,886, Cl. 174-135.000.

Taylor, William T. Swab device. 3,989,106, Cl. 166-176.000.

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Thompson, Francis T.; and Brennen, Michael B., to Westinghouse Electric Corporation. Load saving over current apparatus for shutdown in a reactive power generator. 3,989,999, Cl. 323-9.000.
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Thorner, Robert H. Car-wash device. 3,989,391, Cl. 401-43.000.
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B 24,017	3,914,140	Oct. 21, 1975	B 288,018	3,925,239	Dec. 9, 1975
B 24,018	3,914,206	Oct. 21, 1975	B 288,627	3,916,179	Oct. 28, 1975
B 64,868	3,914,141	Oct. 21, 1975	B 288,638	3,925,132	Dec. 9, 1975
B 78,331	3,914,142	Oct. 21, 1975	B 289,175	3,924,309	Dec. 9, 1975
B 112,422	3,913,484	Oct. 21, 1975	B 289,471	3,917,184	Nov. 4, 1975
B 150,560	3,913,654	Oct. 21, 1975	B 289,523	3,921,166	Nov. 18, 1975
B 176,995	3,915,773	Oct. 28, 1975	B 289,883	3,925,063	Dec. 9, 1975
B 178,475	3,944,602	Mar. 16, 1976	B 290,328	3,924,838	Dec. 9, 1975
B 189,772	3,925,367	Dec. 9, 1975	B 291,104	3,925,007	Dec. 9, 1975
B 189,773	3,925,405	Dec. 9, 1975	B 291,694	3,925,339	Dec. 9, 1975
B 190,679	3,925,346	Dec. 9, 1975	B 292,054	3,915,877	Oct. 28, 1975
B 198,810	3,916,043	Oct. 28, 1975	B 292,126	3,914,465	Oct. 21, 1975
B 204,161	3,924,605	Dec. 9, 1975	B 292,140	3,914,340	Oct. 21, 1975
B 207,272	3,914,123	Oct. 21, 1975	B 292,300	3,927,167	Dec. 16, 1975
B 211,786	3,914,300	Oct. 21, 1975	B 292,563	3,923,653	Dec. 2, 1975
B 213,211	3,925,269	Dec. 9, 1975	B 293,378	3,923,725	Dec. 2, 1975
B 220,683	3,914,471	Oct. 21, 1975	B 293,437	3,913,414	Oct. 21, 1975
B 222,188	3,914,739	Oct. 21, 1975	B 294,103	3,924,396	Dec. 9, 1975
B 223,621	3,925,526	Dec. 9, 1975	B 294,579	3,916,737	Nov. 4, 1975
B 224,323	3,925,476	Dec. 9, 1975	B 294,673	3,916,023	Oct. 28, 1975
B 233,383	3,925,424	Dec. 9, 1975	B 295,481	3,921,593	Nov. 25, 1975
B 233,741	3,925,326	Dec. 9, 1975	B 295,674	3,916,107	Oct. 28, 1975
B 235,011	3,925,086	Dec. 9, 1975	B 295,860	3,923,880	Dec. 2, 1975
B 235,925	3,924,949	Dec. 9, 1975	B 299,267	3,917,106	Nov. 4, 1975
B 236,609	3,925,187	Dec. 9, 1975	B 300,353	3,921,734	Nov. 25, 1975
B 237,953	3,924,051	Dec. 2, 1975	B 302,271	3,929,130	Dec. 30, 1975
B 239,289	3,922,711	Nov. 25, 1975	B 302,692	3,924,598	Dec. 9, 1975
B 241,433	3,923,711	Dec. 2, 1975	B 302,836	3,923,573	Dec. 2, 1975
B 245,194	3,919,179	Nov. 11, 1975	B 302,998	3,928,233	Dec. 23, 1975
B 248,916	3,920,862	Nov. 18, 1975	B 303,011	3,930,188	Dec. 30, 1975
B 251,109	3,914,148	Oct. 21, 1975	B 303,655	3,924,642	Dec. 9, 1975
B 251,635	3,914,149	Oct. 21, 1975	B 303,702	3,914,131	Oct. 21, 1975
B 252,947	3,923,803	Dec. 2, 1975	B 304,687	3,924,783	Dec. 9, 1975
B 254,211	3,917,677	Nov. 4, 1975	B 305,417	3,915,882	Oct. 28, 1975
B 254,708	3,923,878	Dec. 2, 1975	B 305,868	3,921,463	Nov. 25, 1975
B 255,756	3,923,781	Dec. 2, 1975	B 305,881	3,923,478	Dec. 2, 1975
B 256,334	3,924,988	Dec. 9, 1975	B 306,829	3,925,411	Dec. 9, 1975
B 256,936	3,925,513	Dec. 9, 1975	B 306,938	3,916,050	Oct. 28, 1975
B 258,687	3,914,221	Oct. 21, 1975	B 307,677	3,915,276	Oct. 28, 1975
B 259,236	3,924,874	Dec. 9, 1975	B 308,661	3,924,349	Dec. 9, 1975
B 259,274	3,928,688	Dec. 23, 1975	B 308,892	3,919,624	Nov. 11, 1975
B 260,455	3,925,634	Dec. 9, 1975	B 309,207	3,914,743	Oct. 21, 1975
B 260,945	3,925,250	Dec. 9, 1975	B 309,499	3,922,002	Nov. 25, 1975
B 261,378	3,913,468	Oct. 21, 1975	B 309,681	3,927,374	Dec. 16, 1975
B 261,828	3,925,551	Dec. 9, 1975	B 309,755	3,919,468	Nov. 11, 1975
B 262,241	3,925,528	Dec. 9, 1975	B 309,756	3,914,136	Oct. 21, 1975
B 262,287	3,921,209	Nov. 18, 1975	B 309,860	3,922,485	Nov. 25, 1975
B 262,378	3,914,410	Oct. 21, 1975	B 310,149	3,924,705	Dec. 9, 1975
B 264,257	3,928,665	Dec. 23, 1975	B 310,271	3,923,689	Dec. 2, 1975
B 264,833	3,923,566	Dec. 2, 1975	B 310,740	3,985,686	Oct. 12, 1976
B 265,369	3,925,245	Dec. 9, 1975	B 311,313	3,925,142	Dec. 9, 1975
B 265,727	3,914,479	Oct. 21, 1975	B 311,317	3,918,975	Nov. 11, 1975
B 265,862	3,915,915	Oct. 28, 1975	B 311,413	3,925,515	Dec. 9, 1975
B 266,195	3,923,599	Dec. 2, 1975	B 311,910	3,924,357	Dec. 9, 1975
B 269,673	3,914,377	Oct. 21, 1975	B 311,911	3,925,233	Dec. 9, 1975
B 270,089	3,923,875	Dec. 2, 1975	B 312,139	3,925,530	Dec. 9, 1975
B 271,104	3,925,400	Dec. 9, 1975	B 312,477	3,923,714	Dec. 2, 1975
B 274,945	3,924,992	Dec. 9, 1975	B 313,098	3,925,045	Dec. 9, 1975
B 275,426	3,925,168	Dec. 9, 1975	B 313,531	3,925,548	Dec. 9, 1975
B 276,271	3,916,028	Oct. 28, 1975	B 313,594	3,924,626	Dec. 9, 1975
B 276,560	3,916,030	Oct. 28, 1975	B 313,900	3,915,932	Oct. 28, 1975
B 276,993	3,948,823	Apr. 6, 1976	B 314,049	3,920,588	Nov. 18, 1975
B 277,449	3,924,048	Dec. 2, 1975	B 314,255	3,923,764	Dec. 2, 1975
B 278,491	3,921,170	Nov. 18, 1975	B 314,271	3,921,845	Nov. 25, 1975
B 278,991	3,914,469	Oct. 21, 1975	B 314,489	3,925,016	Dec. 9, 1975
B 279,583	3,923,749	Dec. 2, 1975	B 314,800	3,930,087	Dec. 30, 1975
B 280,015	3,925,378	Dec. 9, 1975	B 314,977	3,923,459	Dec. 2, 1975
B 280,395	3,919,604	Nov. 11, 1975	B 315,363	3,920,673	Nov. 18, 1975
B 281,341	3,920,643	Nov. 18, 1975	B 315,397	3,923,963	Dec. 2, 1975
B 281,943	3,924,013	Dec. 2, 1975	B 315,731	3,914,108	Oct. 21, 1975
B 282,081	3,913,483	Oct. 21, 1975	B 316,014	3,920,861	Nov. 18, 1975
B 282,252	3,924,997	Dec. 9, 1975	B 316,239	3,913,546	Oct. 21, 1975
B 282,819	3,982,932	Sep. 28, 1976	B 316,917	3,925,494	Dec. 9, 1975
B 283,124	3,923,512	Dec. 2, 1975	B 317,080	3,925,324	Dec. 9, 1975
B 283,300	3,925,011	Dec. 9, 1975	B 317,347	3,923,552	Dec. 2, 1975
B 284,297	3,913,722	Oct. 21, 1975	B 317,624	3,925,167	Dec. 9, 1975
B 284,427	3,952,812	Apr. 27, 1976	B 318,195	3,915,699	Oct. 28, 1975
B 285,200	3,923,680	Dec. 2, 1975	B 318,618	3,915,365	Oct. 28, 1975
B 285,796	3,914,303	Oct. 21, 1975	B 318,640	3,925,186	Dec. 9, 1975
B 286,499	3,914,129	Oct. 21, 1975	B 318,745	3,916,571	Nov. 4, 1975
B 286,614	3,924,696	Dec. 9, 1975	B 319,226	3,925,082	Dec. 9, 1975
B 286,913	3,928,696	Dec. 23, 1975	B 319,339	3,916,056	Oct. 28, 1975
B 287,164	3,914,139	Oct. 21, 1975	B 319,402	3,919,568	Nov. 11, 1975
B 287,270	3,924,825	Dec. 9, 1975	B 319,414	3,928,666	Dec. 23, 1975
B 287,275	3,925,141	Dec. 9, 1975	B 320,261	3,924,033	Dec. 2, 1975
B 287,373	3,918,568	Nov. 11, 1975	B 320,452	3,925,083	Dec. 9, 1975

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B 320,603	3,915,571	Oct. 28, 1975
B 321,018	3,921,623	Nov. 25, 1975
B 321,101	3,917,163	Nov. 4, 1975
B 321,938	3,923,889	Dec. 2, 1975
B 322,182	3,925,390	Dec. 9, 1975
B 322,239	3,920,973	Nov. 18, 1975
B 322,564	3,914,373	Oct. 21, 1975
B 322,611	3,920,863	Nov. 18, 1975
B 322,777	3,924,382	Dec. 9, 1975
B 323,127	3,923,967	Dec. 2, 1975
B 323,191	3,914,566	Oct. 21, 1975
B 323,203	3,916,165	Oct. 28, 1975
B 323,568	3,920,536	Nov. 18, 1975
B 323,666	3,924,568	Dec. 9, 1975
B 324,495	3,928,664	Dec. 23, 1975
B 324,503	3,928,524	Dec. 23, 1975
B 324,505	3,925,294	Dec. 9, 1975
B 324,739	3,924,990	Dec. 9, 1975
B 324,879	3,923,538	Dec. 2, 1975
B 325,102	3,924,355	Dec. 9, 1975
B 325,262	3,921,304	Nov. 25, 1975
B 326,514	3,925,080	Dec. 9, 1975
B 327,109	3,925,350	Dec. 9, 1975
B 327,363	3,923,504	Dec. 2, 1975
B 327,612	3,925,620	Dec. 9, 1975
B 327,674	3,918,540	Nov. 11, 1975
B 327,899	3,925,674	Dec. 9, 1975
B 328,164	3,914,703	Oct. 21, 1975
B 328,200	3,916,031	Oct. 28, 1975
B 328,205	3,914,106	Oct. 21, 1975
B 328,210	3,914,275	Oct. 21, 1975
B 328,870	3,916,486	Nov. 4, 1975
B 329,115	3,924,727	Dec. 9, 1975
B 329,476	3,920,562	Nov. 18, 1975
B 329,612	3,925,128	Dec. 9, 1975
B 329,787	3,920,688	Nov. 18, 1975
B 329,816	3,923,947	Dec. 2, 1975
B 330,536	3,925,452	Dec. 9, 1975
B 330,828	3,913,589	Oct. 21, 1975
B 331,417	3,914,157	Oct. 21, 1975
B 331,557	3,916,577	Nov. 4, 1975
B 331,895	3,916,403	Oct. 28, 1975
B 332,527	3,924,017	Dec. 2, 1975
B 332,811	3,924,359	Dec. 9, 1975
B 333,876	3,921,208	Nov. 18, 1975
B 333,928	3,927,172	Dec. 16, 1975
B 334,251	3,924,719	Dec. 9, 1975
B 334,868	3,919,469	Nov. 11, 1975
B 334,985	3,923,912	Dec. 2, 1975
B 335,670	3,928,686	Dec. 23, 1975
B 335,741	3,925,615	Dec. 9, 1975
B 335,773	3,920,953	Nov. 18, 1975
B 336,129	3,923,606	Dec. 2, 1975
B 336,243	3,925,422	Dec. 9, 1975
B 336,345	3,925,179	Dec. 9, 1975
B 336,652	3,914,211	Oct. 21, 1975
B 336,902	3,918,897	Nov. 11, 1975
B 336,946	3,919,425	Nov. 11, 1975
B 336,978	3,923,968	Dec. 2, 1975
B 337,235	3,919,386	Nov. 11, 1975
B 337,409	3,925,258	Dec. 9, 1975
B 337,442	3,913,658	Oct. 21, 1975
B 337,703	3,914,690	Oct. 21, 1975
B 337,787	3,923,506	Dec. 2, 1975
B 339,057	3,924,822	Dec. 9, 1975
B 339,218	3,925,121	Dec. 9, 1975
B 339,699	3,933,527	Jan. 20, 1976
B 339,838	3,930,221	Dec. 30, 1975
B 340,212	3,922,645	Nov. 25, 1975
B 340,833	3,925,208	Dec. 9, 1975
B 341,579	3,913,363	Oct. 21, 1975
B 342,084	3,928,694	Dec. 23, 1975
B 342,423	3,925,334	Dec. 9, 1975
B 342,886	3,923,507	Dec. 2, 1975
B 343,136	3,919,453	Nov. 11, 1975
B 343,240	3,925,693	Dec. 9, 1975
B 343,506	3,916,021	Oct. 28, 1975
B 343,577	3,921,165	Nov. 18, 1975
B 344,203	3,928,719	Dec. 23, 1975
B 344,479	3,924,042	Dec. 2, 1975
B 345,060	3,916,018	Oct. 28, 1975
B 345,384	3,916,146	Oct. 28, 1975
B 345,390	3,940,343	Feb. 24, 1976
B 345,422	3,914,392	Oct. 21, 1975
B 345,527	3,927,365	Dec. 16, 1975
B 345,567	3,913,985	Oct. 21, 1975
B 346,044	3,988,405	Oct. 26, 1976
B 346,165	3,913,293	Oct. 21, 1975
B 346,210	3,916,142	Oct. 28, 1975
B 346,350	3,915,824	Oct. 28, 1975
B 346,487	3,927,406	Dec. 16, 1975
B 346,585	3,913,820	Oct. 21, 1975
B 346,613	3,923,545	Dec. 2, 1975
B 346,901	3,915,583	Oct. 28, 1975
B 348,083	3,923,774	Dec. 2, 1975
B 348,383	3,923,452	Dec. 2, 1975
B 348,495	3,914,654	Oct. 21, 1975
B 348,558	3,914,109	Oct. 21, 1975
B 349,141	3,915,363	Oct. 28, 1975
B 349,177	3,914,033	Oct. 21, 1975
B 349,231	3,915,831	Oct. 28, 1975
B 349,321	3,916,103	Oct. 28, 1975
B 349,948	3,914,557	Oct. 21, 1975
B 350,025	3,927,415	Dec. 16, 1975
B 350,143	3,924,419	Dec. 9, 1975
B 350,219	3,917,802	Nov. 4, 1975
B 350,245	3,914,331	Oct. 21, 1975
B 350,523	3,924,726	Dec. 9, 1975
B 350,589	3,927,419	Dec. 16, 1975
B 350,708	3,923,871	Dec. 2, 1975
B 350,843	3,915,461	Oct. 28, 1975
B 351,055	3,914,074	Oct. 21, 1975
B 351,218	3,914,186	Oct. 21, 1975
B 351,222	3,921,179	Nov. 18, 1975
B 351,348	3,923,563	Dec. 2, 1975
B 351,421	3,914,733	Oct. 21, 1975
B 351,493	3,914,758	Oct. 21, 1975
B 351,535	3,915,239	Oct. 28, 1975
B 351,665	3,919,701	Nov. 11, 1975
B 351,672	3,914,000	Oct. 21, 1975
B 351,735	3,913,385	Oct. 21, 1975
B 351,863	3,914,700	Oct. 21, 1975
B 351,883	3,924,657	Dec. 9, 1975
B 351,926	3,914,133	Oct. 21, 1975
B 351,939	3,913,480	Oct. 21, 1975
B 352,445	3,928,746	Dec. 23, 1975
B 352,934	3,913,692	Oct. 21, 1975
B 352,950	3,922,590	Nov. 25, 1975
B 352,965	3,921,926	Nov. 25, 1975
B 353,317	3,916,446	Nov. 4, 1975
B 353,387	3,924,404	Dec. 9, 1975
B 353,546	3,913,273	Oct. 21, 1975
B 354,008	3,925,081	Dec. 9, 1975
B 354,098	3,925,547	Dec. 9, 1975
B 354,145	3,927,279	Dec. 16, 1975
B 354,296	3,914,580	Oct. 21, 1975
B 354,510	3,928,658	Dec. 23, 1975
B 354,889	3,913,204	Oct. 21, 1975
B 354,979	3,914,251	Oct. 21, 1975
B 355,095	3,925,656	Dec. 9, 1975
B 355,269	3,914,561	Oct. 21, 1975
B 355,510	3,913,704	Oct. 21, 1975
B 355,595	3,925,649	Dec. 9, 1975
B 355,876	3,925,685	Dec. 9, 1975
B 356,032	3,928,636	Dec. 23, 1975
B 356,253	3,925,025	Dec. 9, 1975
B 356,602	3,927,393	Dec. 16, 1975
B 356,724	3,924,586	Dec. 9, 1975
B 357,039	3,924,406	Dec. 9, 1975
B 357,057	3,913,738	Oct. 21, 1975
B 357,131	3,924,453	Dec. 9, 1975
B 357,402	3,914,180	Oct. 21, 1975
B 357,682	3,924,973	Dec. 9, 1975
B 357,803	3,919,470	Nov. 11, 1975
B 358,174	3,924,958	Dec. 9, 1975
B 358,244	3,913,411	Oct. 21, 1975
B 358,311	3,923,561	Dec. 2, 1975
B 358,939	3,924,713	Dec. 9, 1975
B 359,174	3,914,117	Oct. 21, 1975
B 359,187	3,924,525	Dec. 9, 1975
B 359,540	3,915,235	Oct. 28, 1975
B 359,740	3,936,212	Feb. 3, 1976
B 359,791	3,929,430	Dec. 30, 1975
B 359,825	3,921,344	Nov. 25, 1975
B 359,946	3,914,132	Oct. 21, 1975
B 359,947	3,914,653	Oct. 21, 1975
B 360,208	3,923,750	Dec. 2, 1975
B 360,296	3,916,720	Nov. 4, 1975
B 360,719	3,915,715	Oct. 28, 1975
B 360,910	3,925,696	Dec. 9, 1975
B 361,265	3,923,569	Dec. 2, 1975
B 361,443	3,927,405	Dec. 16, 1975

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER TRIAL VOLUNTARY PROTEST PROGRAM

JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 361,569	3,914,554	Oct. 21, 1975	B 384,658	3,913,452	Oct. 21, 1975
B 361,604	3,922,702	Nov. 25, 1975	B 384,773	3,915,416	Oct. 28, 1975
B 361,734	3,915,764	Oct. 28, 1975	B 385,210	3,913,406	Oct. 21, 1975
B 362,589	3,914,012	Oct. 21, 1975	B 386,403	3,924,895	Dec. 9, 1975
B 363,205	3,923,744	Dec. 2, 1975	B 386,592	3,925,305	Dec. 9, 1975
B 363,337	3,928,639	Dec. 23, 1975	B 387,039	3,924,510	Dec. 9, 1975
B 363,457	3,922,595	Nov. 25, 1975	B 387,331	3,913,701	Oct. 21, 1975
B 363,674	3,929,716	Dec. 30, 1975	B 387,363	3,927,378	Dec. 16, 1975
B 363,892	3,913,395	Oct. 21, 1975	B 387,687	3,918,151	Nov. 11, 1975
B 363,962	3,921,826	Nov. 25, 1975	B 387,761	3,914,245	Oct. 21, 1975
B 364,022	3,913,499	Oct. 21, 1975	B 387,790	3,925,380	Dec. 9, 1975
B 364,163	3,916,092	Oct. 28, 1975	B 387,818	3,918,935	Nov. 11, 1975
B 364,241	3,916,668	Nov. 4, 1975	B 388,580	3,923,712	Dec. 2, 1975
B 364,334	3,924,670	Dec. 9, 1975	B 389,070	3,914,171	Oct. 21, 1975
B 364,528	3,919,510	Nov. 11, 1975	B 389,285	3,914,631	Oct. 21, 1975
B 364,786	3,921,673	Nov. 25, 1975	B 389,327	3,924,504	Dec. 9, 1975
B 364,910	3,925,335	Dec. 9, 1975	B 389,639	3,914,626	Oct. 21, 1975
B 365,371	3,988,181	Oct. 26, 1976	B 389,726	3,921,010	Nov. 18, 1975
B 365,490	3,918,527	Nov. 11, 1975	B 389,807	3,922,623	Nov. 25, 1975
B 365,834	3,914,702	Oct. 21, 1975	B 389,932	3,913,268	Oct. 21, 1975
B 365,841	3,925,628	Dec. 9, 1975	B 389,933	3,913,267	Oct. 21, 1975
B 365,855	3,917,258	Nov. 4, 1975	B 390,679	3,913,668	Oct. 21, 1975
B 366,287	3,924,946	Dec. 9, 1975	B 390,732	3,913,878	Oct. 21, 1975
B 366,402	3,928,053	Dec. 23, 1975	B 391,184	3,914,214	Oct. 21, 1975
B 366,589	3,914,719	Oct. 21, 1975	B 391,210	3,914,220	Oct. 21, 1975
B 367,021	3,914,752	Oct. 21, 1975	B 391,437	3,915,416	Oct. 28, 1975
B 367,040	3,924,775	Dec. 9, 1975	B 391,509	3,925,175	Dec. 9, 1975
B 367,661	3,914,158	Oct. 21, 1975	B 391,675	3,916,017	Oct. 28, 1975
B 367,739	3,923,648	Dec. 2, 1975	B 392,154	3,923,809	Dec. 2, 1975
B 367,812	3,924,789	Dec. 9, 1975	B 392,242	3,926,636	Dec. 16, 1975
B 368,081	3,924,691	Dec. 9, 1975	B 392,696	3,916,175	Oct. 28, 1975
B 368,387	3,924,923	Dec. 9, 1975	B 392,732	3,914,903	Oct. 21, 1975
B 368,392	3,913,812	Oct. 21, 1975	B 392,753	3,916,341	Oct. 28, 1975
B 368,397	3,914,677	Oct. 21, 1975	B 392,894	3,914,763	Oct. 21, 1975
B 368,862	3,925,549	Dec. 9, 1975	B 393,163	3,914,535	Oct. 21, 1975
B 369,563	3,924,449	Dec. 9, 1975	B 393,347	3,985,800	Oct. 12, 1976
B 369,607	3,923,786	Dec. 2, 1975	B 393,970	3,914,638	Oct. 21, 1975
B 369,997	3,913,533	Oct. 21, 1975	B 394,088	3,914,740	Oct. 21, 1975
B 370,453	3,964,101	Jun. 15, 1976	B 394,188	3,924,591	Dec. 9, 1975
B 370,706	3,925,242	Dec. 9, 1975	B 394,300	3,914,159	Oct. 21, 1975
B 371,073	3,930,135	Dec. 30, 1975	B 394,712	3,916,306	Oct. 28, 1975
B 371,085	3,923,783	Dec. 2, 1975	B 395,478	3,922,577	Nov. 25, 1975
B 371,787	3,921,217	Nov. 18, 1975	B 395,496	3,919,435	Nov. 11, 1975
B 371,805	3,914,433	Oct. 21, 1975	B 395,671	3,920,418	Nov. 18, 1975
B 371,836	3,923,541	Dec. 2, 1975	B 395,889	3,913,190	Oct. 21, 1975
B 372,823	3,924,660	Dec. 9, 1975	B 396,025	3,913,869	Oct. 21, 1975
B 373,297	3,924,436	Dec. 9, 1975	B 396,551	3,921,929	Nov. 25, 1975
B 373,326	3,920,433	Nov. 18, 1975	B 397,027	3,923,736	Dec. 2, 1975
B 373,428	3,915,511	Oct. 28, 1975	B 397,527	3,913,488	Oct. 21, 1975
B 375,220	3,920,417	Nov. 18, 1975	B 397,990	3,914,848	Oct. 28, 1975
B 375,652	3,921,303	Nov. 25, 1975	B 398,262	3,913,481	Oct. 21, 1975
B 376,504	3,914,570	Oct. 21, 1975	B 398,551	3,924,924	Dec. 9, 1975
B 376,654	3,922,513	Nov. 25, 1975	B 398,597	3,913,743	Oct. 21, 1975
B 376,742	3,924,392	Dec. 9, 1975	B 398,625	3,920,996	Nov. 18, 1975
B 376,799	3,913,955	Oct. 21, 1975	B 399,292	3,914,810	Oct. 28, 1975
B 377,172	3,918,255	Nov. 11, 1975	B 399,304	3,919,567	Nov. 11, 1975
B 377,683	3,924,433	Dec. 9, 1975	B 399,349	3,925,694	Dec. 9, 1975
B 377,833	3,913,884	Oct. 21, 1975	B 399,766	3,915,667	Oct. 28, 1975
B 377,869	3,917,002	Nov. 4, 1975	B 400,080	3,925,163	Dec. 9, 1975
B 378,621	3,923,840	Dec. 2, 1975	B 400,293	3,923,719	Dec. 2, 1975
B 379,038	3,923,994	Dec. 2, 1975	B 400,310	3,915,507	Oct. 28, 1975
B 379,172	3,914,379	Oct. 21, 1975	B 401,133	3,924,443	Dec. 9, 1975
B 379,282	3,913,462	Oct. 21, 1975	B 401,992	3,924,898	Dec. 9, 1975
B 379,955	3,913,157	Oct. 21, 1975	B 402,065	3,925,413	Dec. 9, 1975
B 380,014	3,921,915	Nov. 25, 1975	B 402,555	3,914,688	Oct. 21, 1975
B 380,141	3,925,161	Dec. 9, 1975	B 403,140	3,913,486	Oct. 21, 1975
B 380,310	3,921,048	Nov. 18, 1975	B 403,355	3,913,352	Oct. 21, 1975
B 380,312	3,913,953	Oct. 21, 1975	B 403,990	3,914,684	Oct. 21, 1975
B 380,338	3,924,873	Dec. 9, 1975	B 403,996	3,916,016	Oct. 28, 1975
B 380,446	3,923,836	Dec. 2, 1975	B 404,290	3,924,918	Dec. 9, 1975
B 380,900	3,913,307	Oct. 21, 1975	B 404,437	3,915,200	Oct. 28, 1975
B 380,926	3,925,095	Dec. 9, 1975	B 405,136	3,915,565	Oct. 28, 1975
B 381,074	3,919,583	Nov. 11, 1975	B 405,137	3,915,566	Oct. 28, 1975
B 381,632	3,914,732	Oct. 21, 1975	B 405,160	3,924,821	Dec. 9, 1975
B 381,847	3,921,152	Nov. 18, 1975	B 405,248	3,926,294	Dec. 16, 1975
B 382,018	3,929,742	Dec. 30, 1975	B 405,305	3,922,111	Nov. 25, 1975
B 382,021	3,913,212	Oct. 21, 1975	B 405,360	3,913,403	Oct. 21, 1975
B 382,261	3,914,991	Oct. 28, 1975	B 405,495	3,924,577	Dec. 9, 1975
B 382,290	3,924,717	Dec. 9, 1975	B 405,938	3,920,109	Nov. 18, 1975
B 382,783	3,919,527	Nov. 11, 1975	B 406,065	3,914,199	Oct. 21, 1975
B 382,798	3,924,435	Dec. 9, 1975	B 406,357	3,924,529	Dec. 9, 1975
B 382,840	3,922,007	Nov. 25, 1975	B 406,800	3,952,708	Apr. 27, 1976
B 383,465	3,927,412	Dec. 16, 1975	B 407,736	3,924,463	Dec. 9, 1975
B 383,532	3,914,246	Oct. 21, 1975	B 407,357	3,924,614	Dec. 9, 1975
B 383,581	3,925,318	Dec. 9, 1975	B 407,728	3,925,240	Dec. 9, 1975
B 384,499	3,925,135	Dec. 9, 1975	B 408,380	3,984,172	Oct. 5, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER TRIAL VOLUNTARY PROTEST PROGRAM

JANUARY 28, 1975 NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 408,487	3,924,046	Dec. 2, 1975
B 408,749	3,914,116	Oct. 21, 1975
B 409,026	3,925,497	Dec. 9, 1975
B 409,220	3,915,648	Oct. 28, 1975
B 409,251	3,922,620	Nov. 25, 1975
B 409,657	3,927,362	Dec. 16, 1975
B 409,816	3,921,317	Nov. 25, 1975
B 410,062	3,923,855	Dec. 2, 1975
B 410,168	3,914,717	Oct. 21, 1975
B 411,145	3,914,168	Oct. 21, 1975
B 411,356	3,919,649	Nov. 11, 1975
B 411,483	3,925,196	Dec. 9, 1975
B 411,633	3,914,741	Oct. 21, 1975
B 412,516	3,927,417	Dec. 16, 1975
B 412,619	3,925,292	Dec. 9, 1975
B 412,867	3,924,587	Dec. 9, 1975
B 413,006	3,914,850	Oct. 28, 1975
B 413,546	3,924,314	Dec. 9, 1975
B 414,129	3,925,484	Dec. 9, 1975
B 414,288	3,925,537	Dec. 9, 1975
B 415,113	3,915,717	Oct. 28, 1975
B 415,124	3,915,944	Oct. 28, 1975
B 415,845	3,925,076	Dec. 9, 1975
B 415,847	3,914,208	Oct. 21, 1975
B 415,957	3,925,635	Dec. 9, 1975
B 415,977	3,927,359	Dec. 16, 1975
B 416,598	3,923,473	Dec. 2, 1975
B 416,832	3,924,975	Dec. 9, 1975
B 416,710	3,923,746	Dec. 2, 1975
B 416,933	3,924,968	Dec. 9, 1975
B 417,299	3,918,235	Nov. 11, 1975
B 418,121	3,925,023	Dec. 9, 1975
B 418,153	3,925,251	Dec. 9, 1975
B 418,302	3,913,252	Oct. 21, 1975
B 419,327	3,921,197	Nov. 18, 1975
B 419,481	3,924,970	Dec. 9, 1975
B 420,016	3,914,572	Oct. 21, 1975
B 420,148	3,927,414	Dec. 16, 1975
B 420,514	3,923,929	Dec. 2, 1975
B 420,568	3,925,069	Dec. 9, 1975
B 421,026	3,914,785	Oct. 21, 1975
B 421,362	3,924,817	Dec. 9, 1975
B 421,383	3,925,047	Dec. 9, 1975
B 421,797	3,914,023	Oct. 21, 1975
B 422,399	3,928,656	Dec. 23, 1975
B 422,467	3,924,804	Dec. 9, 1975
B 422,949	3,921,873	Nov. 25, 1975
B 424,415	3,919,458	Nov. 11, 1975
B 424,462	3,920,522	Nov. 18, 1975
B 424,572	3,924,979	Dec. 9, 1975
B 424,748	3,924,395	Dec. 9, 1975
B 425,035	3,914,025	Oct. 21, 1975
B 425,345	3,922,015	Nov. 25, 1975
B 425,470	3,923,796	Dec. 2, 1975
B 425,539	3,916,742	Nov. 4, 1975
B 425,541	3,914,051	Oct. 21, 1975
B 425,572	3,923,822	Dec. 2, 1975
B 425,770	3,989,817	Nov. 2, 1976
B 427,631	3,921,433	Nov. 25, 1975
B 428,177	3,914,624	Oct. 21, 1975
B 428,795	3,921,056	Nov. 18, 1975
B 429,442	3,923,485	Dec. 2, 1975
B 430,106	3,918,941	Nov. 11, 1975
B 430,140	3,922,084	Nov. 25, 1975
B 430,798	3,918,204	Nov. 11, 1975
B 430,944	3,922,096	Nov. 25, 1975
B 432,373	3,919,670	Nov. 11, 1975
B 433,587	3,914,567	Oct. 21, 1975
B 435,343	3,919,244	Nov. 11, 1975
B 435,844	3,925,170	Dec. 9, 1975
B 437,173	3,924,627	Dec. 9, 1975
B 437,172	3,913,251	Oct. 21, 1975
B 437,195	3,914,618	Oct. 21, 1975
B 437,450	3,922,479	Nov. 25, 1975
B 438,053	3,916,013	Oct. 28, 1975
B 438,706	3,925,050	Dec. 9, 1975
B 439,168	3,919,676	Nov. 11, 1975
B 439,669	3,921,499	Nov. 25, 1975
B 440,898	3,921,789	Nov. 25, 1975
B 441,024	3,913,629	Oct. 21, 1975
B 441,416	3,913,851	Oct. 21, 1975
B 442,280	3,914,054	Oct. 21, 1975
B 442,859	3,918,570	Nov. 11, 1975
B 442,919	3,925,483	Dec. 9, 1975
B 444,614	3,927,996	Dec. 23, 1975
B 445,471	3,914,711	Oct. 21, 1975
B 445,740	3,923,612	Dec. 2, 1975
B 448,571	3,924,760	Dec. 9, 1975
B 449,647	3,916,797	Nov. 4, 1975
B 450,499	3,920,526	Nov. 18, 1975
B 450,546	3,924,417	Dec. 9, 1975
B 450,927	3,913,844	Oct. 21, 1975
B 455,520	3,922,543	Nov. 25, 1975
B 455,775	3,914,356	Oct. 21, 1975
B 456,346	3,914,531	Oct. 21, 1975
B 459,425	3,928,773	Dec. 23, 1975
B 461,872	3,919,586	Nov. 11, 1975
B 467,684	3,915,119	Oct. 28, 1975
B 468,198	3,925,340	Dec. 9, 1975

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 2ND DAY OF NOVEMBER, 1976

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687.

Attwood, Terence E., and B. W. Farrant. Coating composition comprising PTFE, polyphenylene sulfide and a polysulfone. T952,005, 11–2–76, Cl. 260—900.

Brackman, Derek. Heat exchanger and a solar heater including the heat exchanger. T952,004, 11–2–76, Cl. 126—271.

Coote, Gerald, and P. T. Stainforth. Powder feeder. T952,011, 11–2–76, Cl. 241—186.

Ferrant, Barry W.: *See*—
Attwood, Terence E., and Farrant. T952,005.

Gregson, Leslie. Polymeric films. T952,010, 11–2–76, Cl. 260—37.

Hatfield, John D.: *See*—
Walters, Henry K., Jr., Kim, and Hatfield. T952,002.

Hausch, Walter R. Method of producing vehicle tires. T952,006, 11–2–76, Cl. 264—311.

Hicks, William F.: *See*—
Nield, Eric, Thomas, and Hicks. T952,007.

Kay, Edward L.: *See*—
Lawson, David F., Roberts, and Kay. T952,009.

Kim, Yong K.: *See*—
Walters, Henry K., Jr., Kim, and Hatfield. T952,002.

Lawson, David F., D. T. Roberts, Jr., and E. L. Kay. Latex foam having reduced smoke emission on combustion. T952,009, 11–2–76, Cl. 260—2.5.

Lee, James M. Variable impedance pull-up driver. T952,012, 11–2–76, Cl. 307—205.

McClellan, Guerry H.: *See*—
Scheib, Robin M., and McClellan. T952,001.

McCullough, John F., and R. C. Sheridan. Production of ammonium polyphosphates from melamine phosphates. T952,008, 11–2–76, Cl. 423—305.

Nield, Eric, D. A. Thomas, and W. F. Hicks. Method of packaging. T952,007, 11–2–76 Cl. 264—230.

Perri, Joseph M. Product. T952,003, 11–2–76, Cl. 428—97.

Roberts, Durward T., Jr.: *See*—
Lawson, David F., Roberts, and Kay. T952,009.

Scheib, Robin M., and G. H. McClellan. Rapid method for determining dissolution rates of controlled release fertilizer materials. T952 001, 11–2–76, Cl. 23—230.

Sheridan, Richard C.: *See*—
McCullough, John F., and Sheridan. T952,008.

Stainforth, Peter T.: *See*—
Coote, Gerald, and Stainforth. T952,011.

Thomas, Daphne A.: *See*—
Nield, Eric, Thomas, and Hicks. T952,007.

Walters, Henry K., Jr., Y. K. Kim, and J. D. Hatfield. Partial purification of wet-process phosphoric acid with acetone and ammonia. T952,002, 11–2–76, Cl. 71—34.

LIST OF REISSUE PATENTEES

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PATENTS WERE ISSUED ON THE 2ND DAY OF NOVEMBER, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Alford, John A.; Tefertiller, Ben A., Jr.; and Tomalia, Donald A., to Dow Chemical Company, The. Reaction products of polyepoxide and excess di-2-oxazoline. Re. 29,027, Cl. 260-47.0EN.

Archibald, William R.; and Gilbert, John J., to Marcona Corporation. Underground mining system. Re. 29,021, Cl. 175-213.000.

Clark Equipment Company: *See*—
Hansen, Howard C., Re. 29,025.

Cornell Aeronautical Laboratory, Inc.: *See*—
Rosenthal, Paul, Re. 29,026.

Dow Chemical Company, The: *See*—
Alford, John A.; Tefertiller, Ben A., Jr.; and Tomalia, Donald A., Re. 29,027.

Gilbert, John J.: *See*—
Archibald, William R.; and Gilbert, John J., Re. 29,021.

Hansen, Howard C., to Clark Equipment Company. Method and apparatus for determining elevation. Re. 29,025, Cl. 356-138.000.

Hoechst Aktiengesellschaft: *See*—
Katsimbas, Themistoklis, Re. 29,028.

Joy Manufacturing Company: *See*—
Moody, David L.; and Loftis, James B., Re. 29,020.

Katsimbas, Themistoklis, to Hoechst Aktiengesellschaft. Heat-curable pulverulent coating agent consisting of a mixture of copolymers containing glycidyl groups, dicarboxylic acid anhydrides and curing anhydrides. Re. 29,028, Cl. 260-836.000.

Loftis, James B.: *See*—
Moody, David L.; and Loftis, James B., Re. 29,020.

Malvestuto, Frank S., Jr. Means and method of rotor augmented lift for airplanes. Re. 29,023, Cl. 244-6.000.

Marcona Corporation: *See*—
Archibald, William R.; and Gilbert, John J., Re. 29,021.

Moody, David L.; and Loftis, James B., to Joy Manufacturing Company. Drilling apparatus. Re. 29,020, Cl. 175-52.000.

Reffell, Brian Richard Arnold, to Walter Kidde & Company, Inc., The. Parachute. Re. 29,024, Cl. 244-145.000.

Rosenthal, Paul, to Cornell Aeronautical Laboratory, Inc. Embrittlement machining method. Re. 29,026, Cl. 204-129.460.

Spencer, Lloyd. Self-flushing irrigation valve. Re. 29,022, Cl. 239-542.000.

Tefertiller, Ben A., Jr.: *See*—
Alford, John A.; Tefertiller, Ben A., Jr.; and Tomalia, Donald A., Re. 29,027.

Tomalia, Donald A.: *See*—
Alford, John A.; Tefertiller, Ben A., Jr.; and Tomalia, Donald A., Re. 29,027.

Walter Kidde & Company, Inc., The: *See*—
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LIST OF PLANT PATENTEES

Armstrong, David L. Rose plant. 3,972, 11–2–76, Cl. 20.

De Coster, Paul, and A. Simoens. Neoregelic plant. 3,971, 11–2–76, Cl. 88.

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Casey, Neil W., to Jack Dymond Co. Room partition or similar article. 242,100, 11–2–76, Cl. D6—139.
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Evans, Connie. Kidney support belt. 242,174, 11–2–76, Cl. D83—1.
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CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 2, 1976

NOTE.—First number, class; second number, subclass; third number, patent number

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2.5 3,988,780
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CLASS 3
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CLASS 4
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57P 3,988,785
67A 3,988,786
172.17 3,988,787
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343 3,988,791
365 3,988,792
3,988,793

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88 3,988,798
97R 3,988,799

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35R 3,988,800
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115 3,988,802

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23 3,988,803
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259.3 3,989,470
260 3,989,464
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267MS 3,989,467
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85R 3,988,809
128R 3,988,810
186 3,988,811
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33K 3,988,815
116R 3,988,816
130 3,988,817
149.5B 3,988,818
193 3,989,474
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237 3,988,819
244 3,988,820
283 3,988,821
427 3,988,822
577 3,988,823
3,988,824
622 3,988,825
623.1 3,989,540

CLASS 30
90.4 3,988,826
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42.31 3,988,851
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63 3,989,476

CLASS 46
26 3,988,854
161 3,988,855
175R 3,988,856

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1.2 3,988,857
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CLASS 48
144 3,989,477
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197FM 3,989,479
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285 3,988,869
296 3,988,870
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27 3,988,873
59W 3,988,874
123 3,988,875
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105 3,989,486
208 3,989,487
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502 3,989,491

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330 3,988,878

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34R 3,988,879
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140R 3,988,882
162 3,988,884

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204 3,988,888
226A 3,988,889
274 3,988,890
288 3,988,891
420 3,988,892
445 3,988,893
606 3,988,894
641 3,988,895
3,988,896
682 3,988,897

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53 3,988,899
98 3,988,898

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92 3,988,900
116 3,988,901
136 3,988,902
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CLASS 65
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40.7 3,988,920
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104 3,988,924
119R 3,988,925
178R 3,988,927
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505 3,988,944
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545 3,988,946
572 3,988,947
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687 3,988,949
798 3,988,950
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.5BB 3,989,511
.5A 3,989,509
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30 3,989,513
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172R 3,989,515
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175.5 3,989,517
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485 3,988,976

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35 3,988,978
50 3,988,979
53 3,988,980
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55 3,989,533
86 3,989,534
203 3,989,535

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74A 3,988,995
115 3,988,996
219 3,988,997
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235A 3,988,999

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614.11 3,989,064
615 3,989,065
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316 3,989,078

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6.3 3,989,549
11.5R 3,989,551
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354 3,989,083

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155 3,989,566
158 3,989,567
182 3,989,568
234 3,989,569
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250 3,989,571
252 3,989,572
330 3,989,573
351 3,989,574
355 3,989,575
361 3,989,576
364 3,989,577
433 3,989,578
443 3,989,579
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510 3,989,581
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69.5R 3,989,894

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3,988,787	3,989,153	3,989,942	3,989,535	3,988,908	3,989,669
3,988,836	3,989,158	3,989,943	3,989,628	3,988,939	3,989,719
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3,988,821	3,989,619	3,988,852	3,989,156	3,989,249	3,989,329
3,988,822	3,989,622	3,989,067	3,989,217	3,989,251	3,989,417
3,988,823	3,989,625	3,989,173	3,989,220	3,989,264	3,989,436
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Elliot L. Richardson, Secretary

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